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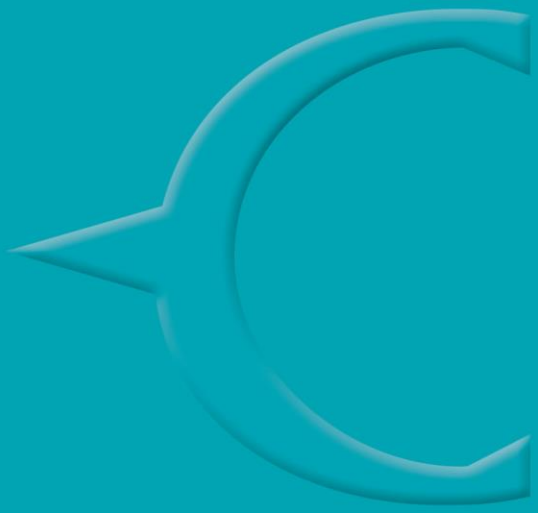

City of Kansas City, Missouri Firefighters' Pension System

Actuarial Valuation as of May 1, 2021

Produced by Cheiron
September 2021

www.cheiron.us 1.877.CHEIRON (243.4766)

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September 17, 2021

Board of Pension Trustees
City of Kansas City, Missouri Firefighters' Pension System
12th Floor, City Hall
414 East 12th Street
Kansas City, Missouri 64106

Dear Members of the Board:

At your request, we have conducted an actuarial valuation of the City of Kansas City, Missouri Firefighters' Pension System (FPS) as of May 1, 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.

- In Section II, **Disclosures Related to Risk,** we identify and assess the primary risks to the System in accordance with Actuarial Standard of Practice No. 51.

- The **Main Body** of the report presents details on the System's:
  - Section III Assets
  - Section IV Liabilities
  - Section V Contributions
  - Section VI Financial Statement Information

- In the **Appendices,** we conclude our report with detailed information describing System 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 purpose of this report is to present the annual actuarial valuation of the City of Kansas City, Missouri Firefighters' Pension System. This report is for the use of the Firefighters' Pension Board and its auditors in preparing financial reports in accordance with applicable law and accounting requirements.

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

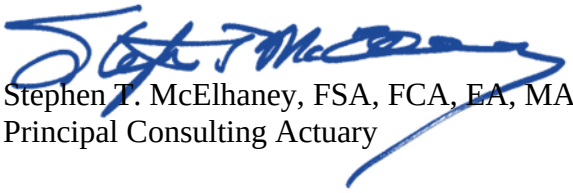
Future results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law.

Board of Pension Trustees
September 17, 2021

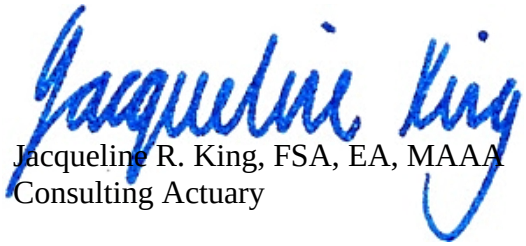
This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable 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 report was prepared for the Firefighters' Pension System for the purposes described herein and for the use by the Plan auditor in completing an audit related to the matters herein. Other users of this valuation report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

Sincerely,
Cheiron



Stephen T. McElhaney, FSA, FCA, EA, MAAA
Principal Consulting Actuary



Jacqueline R. King, FSA, EA, MAAA
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 primary risks to the System,
- The City's contributions for Fiscal Year 2023, and
- Information required for the System's financial statement.

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

This May 1, 2021 valuation represents Cheiron's fifteenth valuation performed for FPS. There have been no changes in assumptions, methodologies, and plan provisions since the May 1, 2020 valuation. The contribution rate changes as a result of the May 1, 2017 revised assumptions are being phased in over five years, and the current valuation is at the fifth year of this phase-in. The data, methods, assumptions, and plan provisions that serve as the basis for this valuation are all summarized in the appendices.

B. Key Findings of this Valuation

The key results of the May 1, 2021 actuarial valuation are as follows:

- We have calculated the City's contribution rate on two bases:
    - The actuarially determined City contribution rate under the Board's funding policy would have decreased from 40.00% as of May 1, 2020 to 39.00% as of May 1, 2021 if the full effect of the May 1, 2017 revised actuarial assumptions had been recognized at both valuation dates. However, after reflecting the five-year phase-in of the revised assumptions, the actuarially determined employer contribution rate as of May 1, 2020 was 38.47%, so the increase in the rate to 39.00% reflects both the experience during the year as well as the final year of the assumption phase-in. The actual rate that the City is scheduled to contribute for the current year is 38.47% of payroll, which is the actuarially determined Board contribution rate reflecting the five-year phase-in for the prior year.
    - Under the City ordinance, the City's contribution rate for the year beginning May 1, 2022 is to be based upon a 30-year closed amortization from May 1, 2014, for the entire amount of unfunded actuarial liability. This rate is 37.65%, which also reflects the full phase-in of the revised actuarial assumptions.

SECTION I – BOARD SUMMARY

- The FPS's unfunded actuarial liability decreased from $255 million on May 1, 2020 to $235 million on May 1, 2021.

- The FPS's funding ratio, the ratio of the actuarial value of assets over the actuarial liability, increased from 68.9% as of May 1, 2020 to 72.2% as of May 1, 2021.

- The primary factor in the increase in the System's funded status was an overall actuarial gain of $20.4 million.
  - During the year ended April 30, 2021, the System's assets returned 30.62% on a market value basis. The return on the actuarial asset value (i.e. incorporating asset smoothing) was 10.24% (as compared to 7.25% assumed). This resulted in an actuarial gain on investments of $16.7 million. In addition, the system experienced a loss of $3.1 million due to the difference between actual and actuarially determined contributions (without phase-in) as a result of differences between actual and expected covered plan payroll and timing differences as well as the five-year phase-in of the assumption changes.
  - On the liability side, the System experienced an actuarial gain of $6.8 million.

- As of May 1, 2021, the market value of assets exceeded the actuarial value by $59.0 million. The System will recognize this difference as deferred asset losses and gains over the next four years.

This report does not include disclosures required by GASB Statements No. 67 and 68. Statement No. 67 is effective for the plan year ending April 30, 2015 and Statement No. 68 is effective for the employer fiscal year ending April 30, 2016. Please refer to the separate report issued by Cheiron for accounting and financial disclosure information under GASB Statements No. 67 and No 68.

SECTION I – BOARD SUMMARY

The following Table I-1 summarizes all the key results of the valuation with respect to System membership, assets and liabilities, and contributions. The results are presented and compared for both the current and prior plan years.

Table I-1
City of Kansas City, Missouri Firefighters' Pension System
Summary of Principal Plan Results

Valuation as of:	May 1, 2020	May 1, 2021	% Change
Participant Counts			
Active Participants	1,011	1,016	0.5%
Non-duty Disabled Participants *	5	4	(20.0%)
Duty Disabled Participants *	113	114	0.9%
Retirees and Beneficiaries *	810	821	1.4%
Terminated Vested Participants	12	11	(8.3%)
Inactive Participants	13	25	92.3%
Total	**1,964**	**1,991**	1.4%
Annual Salaries of Active Members	$ 69,674,827	$ 70,004,912	0.5%
Annual Retirement Allowances for Retired Members and Beneficiaries	$ 41,259,840	$ 42,824,684	3.8%
Assets and Liabilities			
Actuarial Liability (AL)	$ 822,426,696	$ 845,938,514	2.9%
Actuarial Value of Assets	566,945,184	610,548,543	7.7%
Unfunded Actuarial Liability (UAL)	$ 255,481,512	$ 235,389,971	(7.9%)
Funded Ratio (AVA)	68.9%	72.2%	
Funded Ratio (MVA)	63.8%	79.1%	
Present Value of Accrued Benefits (PVAB)	$ 759,633,976	$ 788,188,276	3.8%
Market Value of Assets	524,724,671	669,546,458	27.6%
Unfunded PVAB	$ 234,909,305	$ 118,641,818	(49.5%)
Accrued Benefit Funding Ratio	69.1%	84.9%	
Contributions as a Percentage of Payroll under Board's Funding Policy **	**Fiscal Year 2022**	**Fiscal Year 2023**	
Normal Cost Contribution	14.36%	14.71%	
Administrative Expense Rate	0.43%	0.45%	
Unfunded Actuarial Liability Contribution	23.68%	23.84%	
Total Contribution	38.47%	39.00%	
Actuarially Determined Contribution (GASB)	$26,803,906	$27,301,916	1.9%

** Disabled participants that were eligible for voluntary retirement at the time of their disability are valued as Retirees. The number of such participants was 306 at May 1, 2020 and 322 at May 1, 2021.*

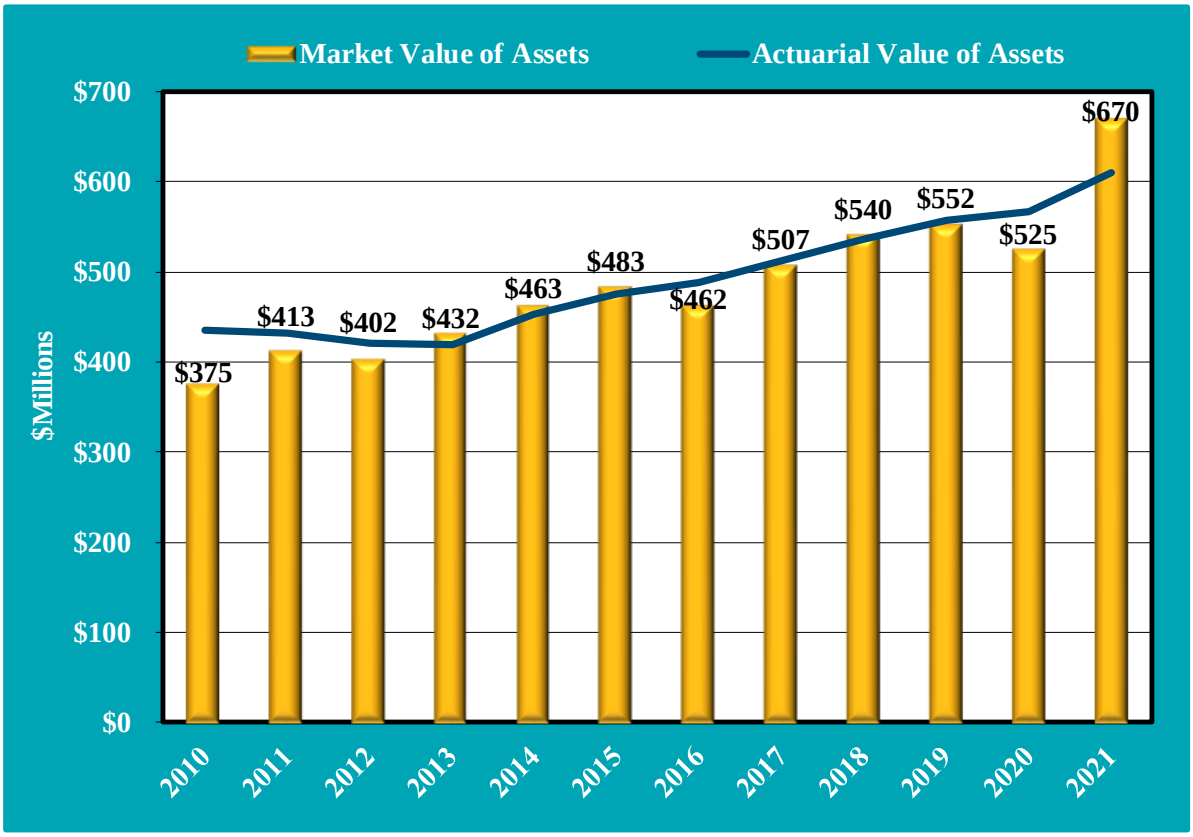
*** Fiscal Year 2022 and 2023 contribution rate and ADC reflect the 5-year phase-in of the 2017 assumption changes*

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 City's contribution, it is important to remember that each valuation is merely a snapshot in the long-term progress of a pension fund. It is more important to judge a current year's valuation result relative to historical trends, as well as trends expected into the future. Significant prior volatility is exhibited within these trend charts. This volatility helps to illustrate the risks to the System which are discussed more fully in Section II of this report.

System Assets

The chart below shows the market value of assets and the actuarial value of assets over the last twelve years. The numbers above the bars represent the value (in millions) of the market value of assets.

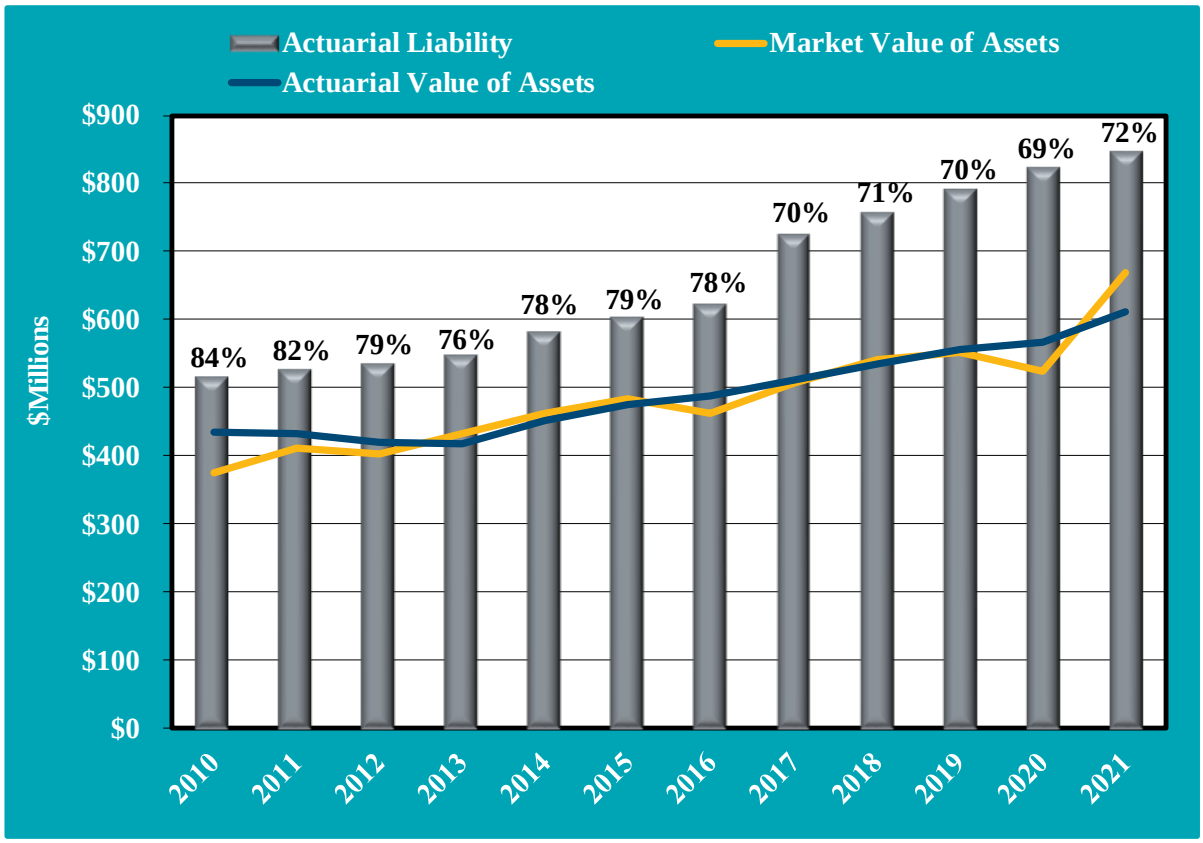


The market value of assets (MVA) returned 30.62% in 2021 compared to an assumed rate of 7.25%. With the asset smoothing method in place, the actuarial value of assets has tracked a slightly smoother path through the volatility of the market value of assets.

SECTION I – BOARD SUMMARY

Assets and Liabilities

The chart below compares the market value of assets, the actuarial value of assets, and the actuarial liabilities, as well as the funded ratio (actuarial value of assets / actuarial liability). This chart shows that the System's Funding Ratio has fluctuated, with 2017 being the largest decrease as a result of the changes to actuarial assumptions.



SECTION I – BOARD SUMMARY

Contribution Rates

The stacked bars in this graph show the dollar amount of contributions made by the City and the members (depicted on the left-hand scale) since Fiscal Year Ending 2011. The blue line shows the City's actuarially determined contribution rate under the Board's funding policy as a percent of payroll (depicted on the right-hand scale). The black line shows the City's scheduled contribution rate as a percent of payroll (depicted on the right-hand scale).

The member contribution rate is set by City law at 9.55% of payroll prior to April 20, 2014 and 10.55% of payroll effective April 20, 2014.

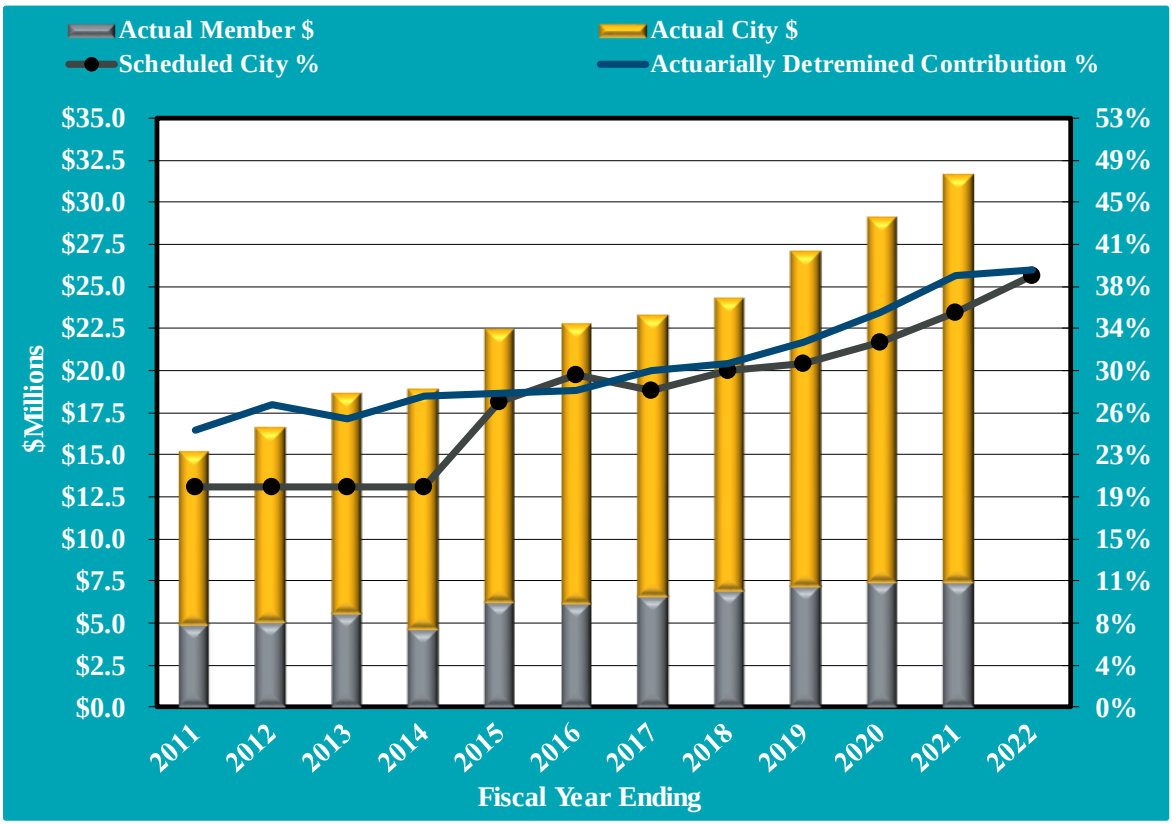
The scheduled contribution rate is as follows:

- For fiscal years ending 2014 and earlier, the scheduled City contribution rate was scheduled to be 19.60% of payroll.

- For fiscal years ending 2015 and later, the scheduled City contribution rate is set as the actuarially determined contribution rate in the prior year's actuarial valuation.

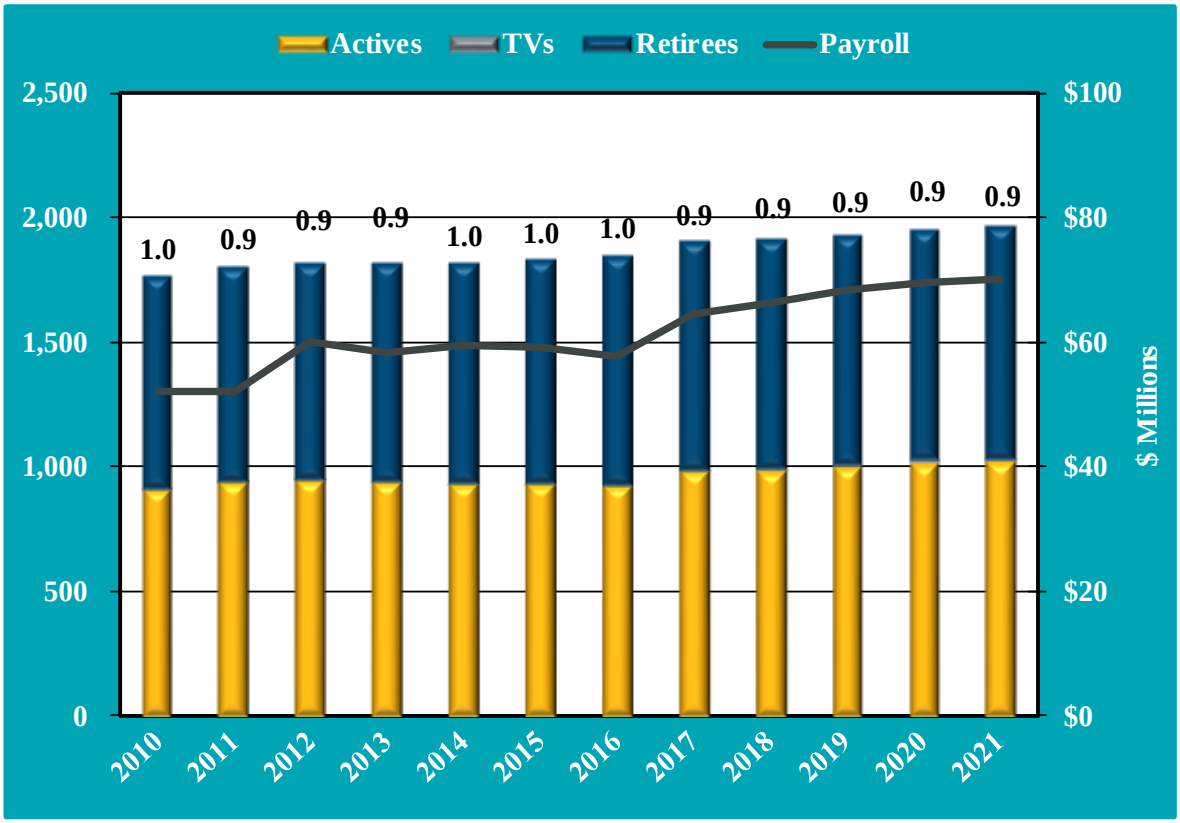
The actuarial determined contribution rate under the Board's funding policy increased from 38.47% of payroll in 2020 to 39.00% of payroll in 2021 reflecting the phase-in of changes in actuarial assumptions. For the fiscal year ending 2022, the City is contributing 38.47% of payroll.

SECTION I – BOARD SUMMARY



SECTION I – BOARD SUMMARY

Participant Trends



The above chart provides a measure for the maturity in the System, by comparing the ratio of inactive members (retirees and terminated-vesteds) to active members. The System's inactive-to-active ratio remained fairly consistent over the last 12 years. The black line shows the total active participating payroll for each valuation year (depicted on the right-hand scale).

D. Future Expected Financial Trends

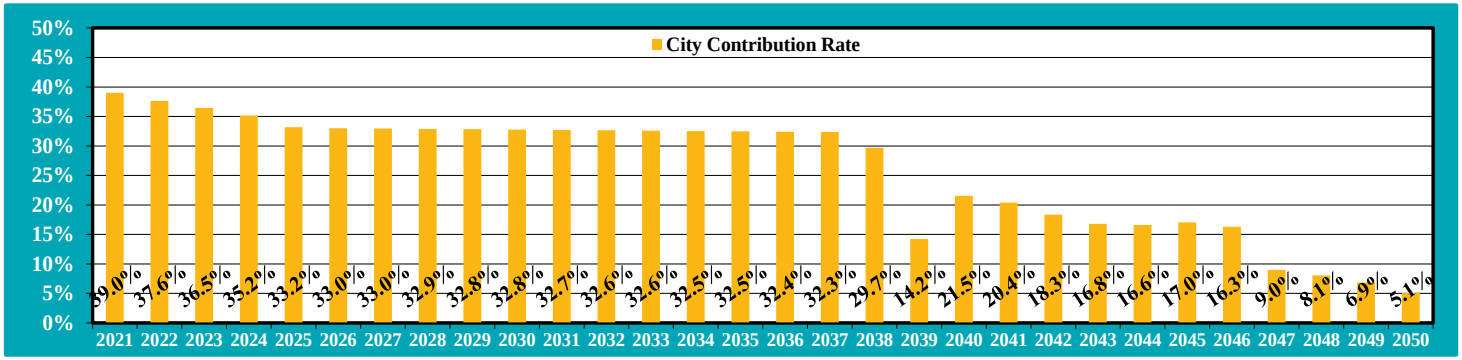
The analysis of projected financial trends is perhaps the most important component of this valuation. In this Section, we present the implications of the May 1, 2021 valuation results in terms of (1) the projected City's contributions and (2) the projected System's funded status (ratio of assets over liabilities). For each projection set, we assume three different future investment return scenarios: baseline returns of 7.25%, optimistic returns of 8.75%, and pessimistic returns of 5.75%. The projections also assume that all other assumptions in the valuation are met, that the total active member payroll grows at 3% per year, and that the City makes contributions equal to the prior year's actuarially determined contribution rate under the Board's funding policy. The differences in projected contribution levels and funded ratios under each of the scenarios help to illustrate the investment risk faced by the System.

1. Contribution Rate Projections (Board Funding Policy)

The first set of charts show the expected City contribution rate. The years shown in the charts are plan years beginning May 1.

Baseline Returns of 7.25%

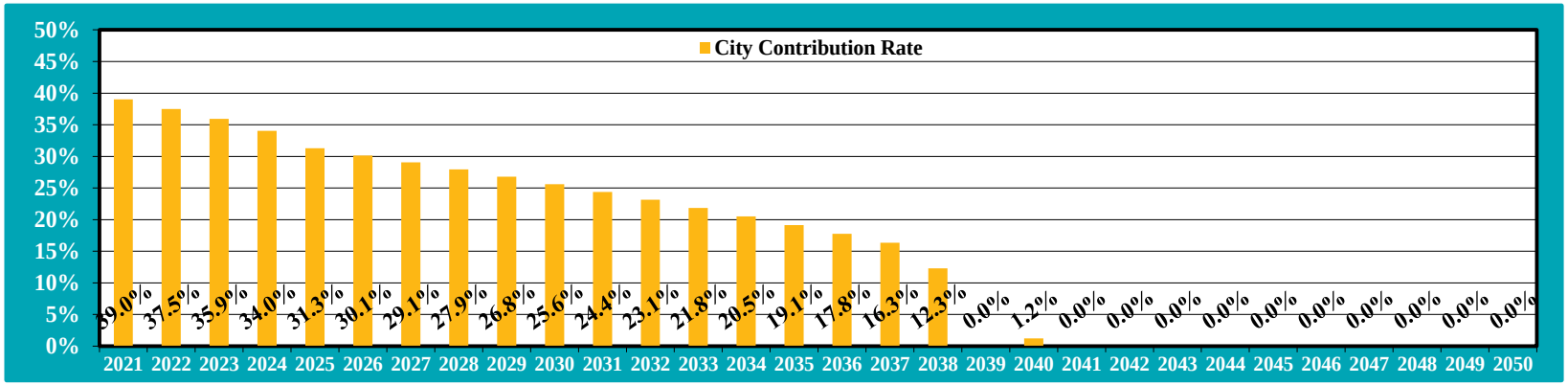
Assuming that the fund earns the assumed investment rate of 7.25% on a market value basis and that the City continues to contribute the current scheduled contribution rate equal to the prior year's actuarially determined contribution rate, the contribution rate will decrease over the next five years as the 2021 investment gains are recognized and then remain fairly constant until 2038. The large decrease in the rate in 2039 reflects the full amortization of the 30-year loss base established in 2009.



SECTION I – BOARD SUMMARY

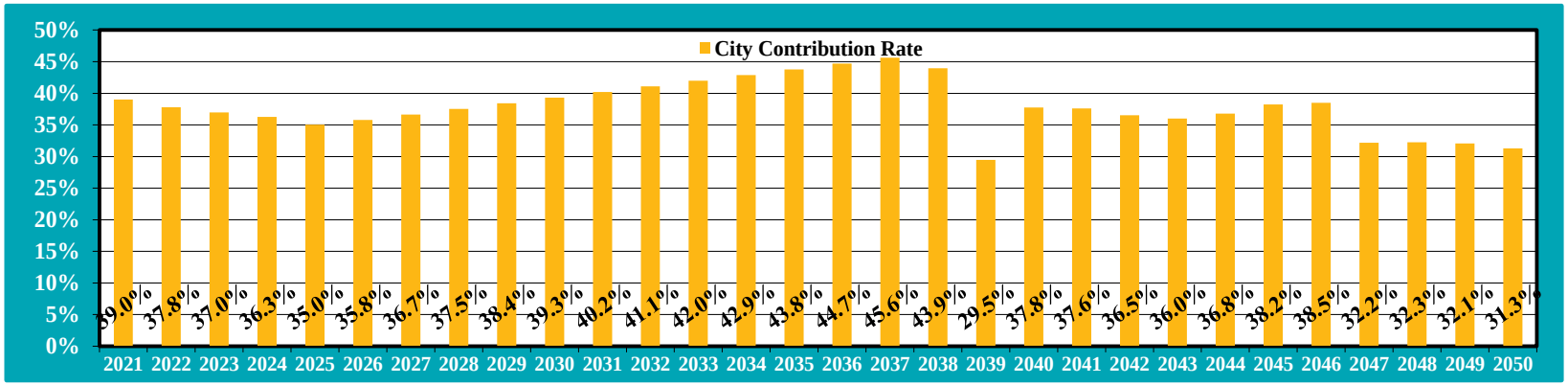
Optimistic Returns of 8.75%

If the fund earns 1.50% more than the assumed rate, all of the future contribution rates will be lower than if the fund earns the assumed rate of 7.25%. The contribution rate decreases to zero for 2039 due to the full amortization of the 2009 loss, then increases for one year and would become zero for 2041 and later.



Pessimistic Returns of 5.75%

If the fund earns 1.50% less than the assumed rate, all of the future contribution rates will be greater than if the fund earns the assumed rate of 7.25%.



SECTION I – BOARD SUMMARY

The following table shows the corresponding contribution dollar amounts of the percentages in the prior charts.

City of Kansas City, Missouri Firefighters' Pension System
Projection Based on April 30, 2021 Actuarial Valuation
Current Amortization Schedule
Discount Rate of 7.25%
Amounts in thousands

Valuation as of April 30,	Dollar Amount of ADC at Various Investment Returns 7.25%	8.75%	5.75%
2021	$ 27,302	$ 27,302	$ 27,302
2022	27,146	27,031	27,261
2023	27,081	26,684	27,473
2024	26,896	26,042	27,735
2025	26,143	24,645	27,598
2026	26,791	24,458	29,035
2027	27,546	24,291	30,639
2028	28,325	24,063	32,320
2029	29,123	23,766	34,075
2030	29,941	23,396	35,908
2031	30,780	22,947	37,821
2032	31,643	22,418	39,820
2033	32,530	21,802	41,909
2034	33,438	21,090	44,087
2035	34,374	20,282	46,364
2036	35,342	19,375	48,750
2037	36,343	18,363	51,246
2038	34,375	14,235	50,856
2039	16,961	-	35,106
2040	26,449	1,516	46,351
2041	25,775	-	47,527
2042	23,887	-	47,587
2043	22,545	-	48,293
2044	22,954	-	50,852
2045	24,252	-	54,406
2046	23,924	-	56,446
2047	13,566	-	48,574
2048	12,544	-	50,162
2049	10,991	-	51,351
2050	8,406	-	51,642
2051	11,340	-	57,592

Projections assume a constant population and no actuarial gains and losses

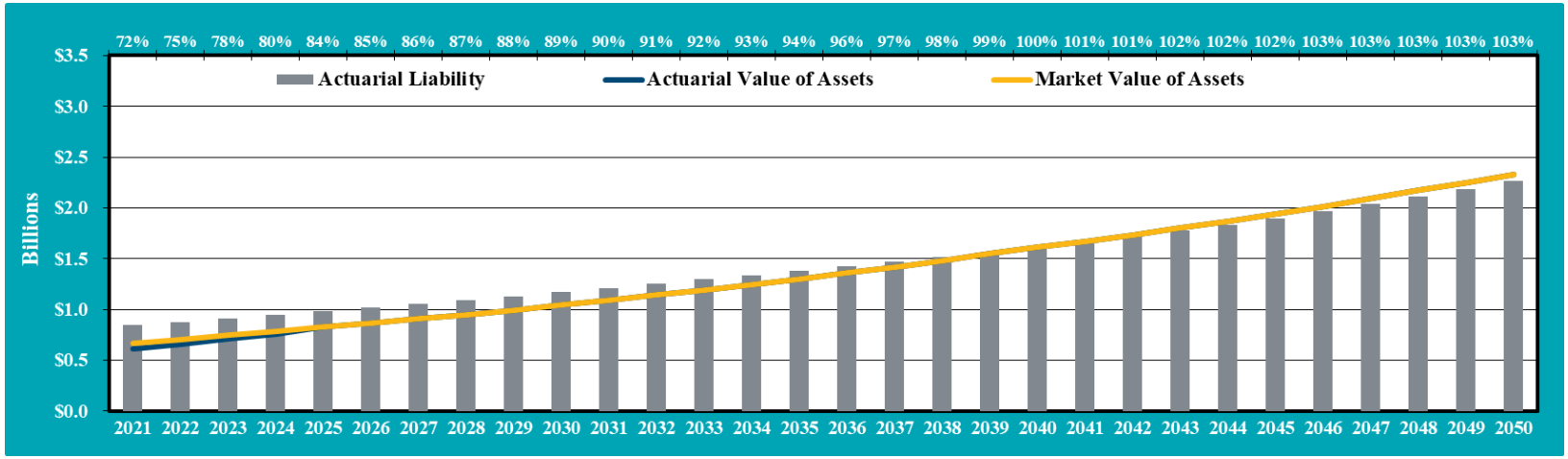
SECTION I – BOARD SUMMARY

2. Asset and Liability Projections (Board Funding Policy)

This next set of projections compare 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). The top of each chart also portrays the System's funded ratio (ratio of the actuarial value of assets to actuarial liabilities). The years shown in the charts are plan years beginning May 1.

Baseline Returns of 7.25%

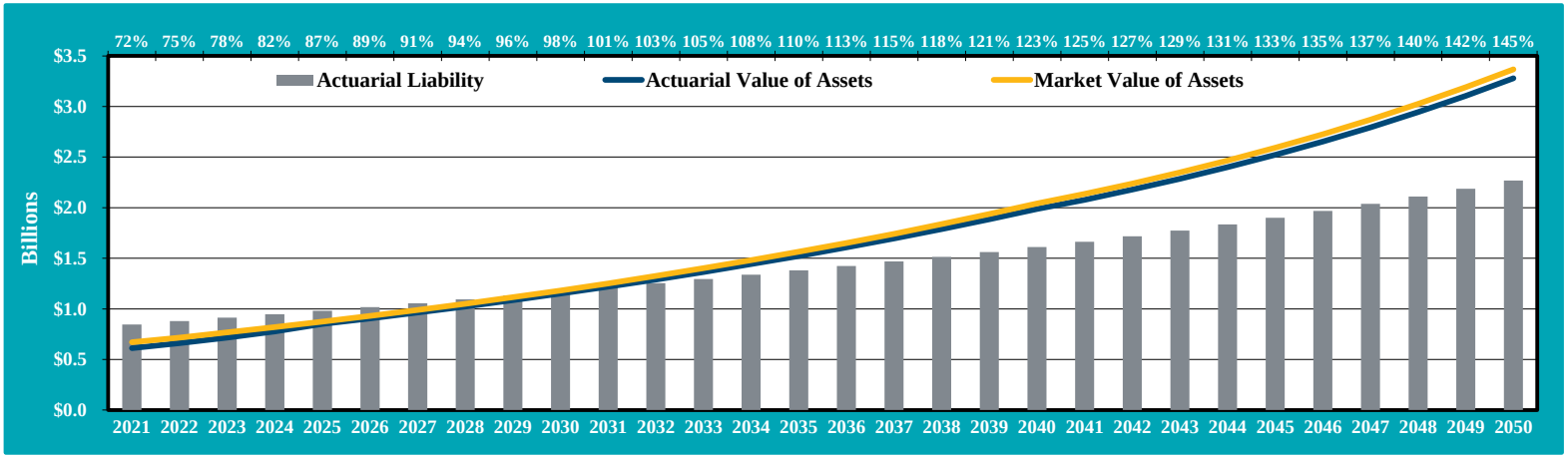
If the fund earns the assumed investment rate of 7.25% and the City continues to contribute the current scheduled contribution rate equal to the prior year's actuarially determined contribution rate, the funded ratio will increase gradually to 103% over the next 30 years.



SECTION I – BOARD SUMMARY

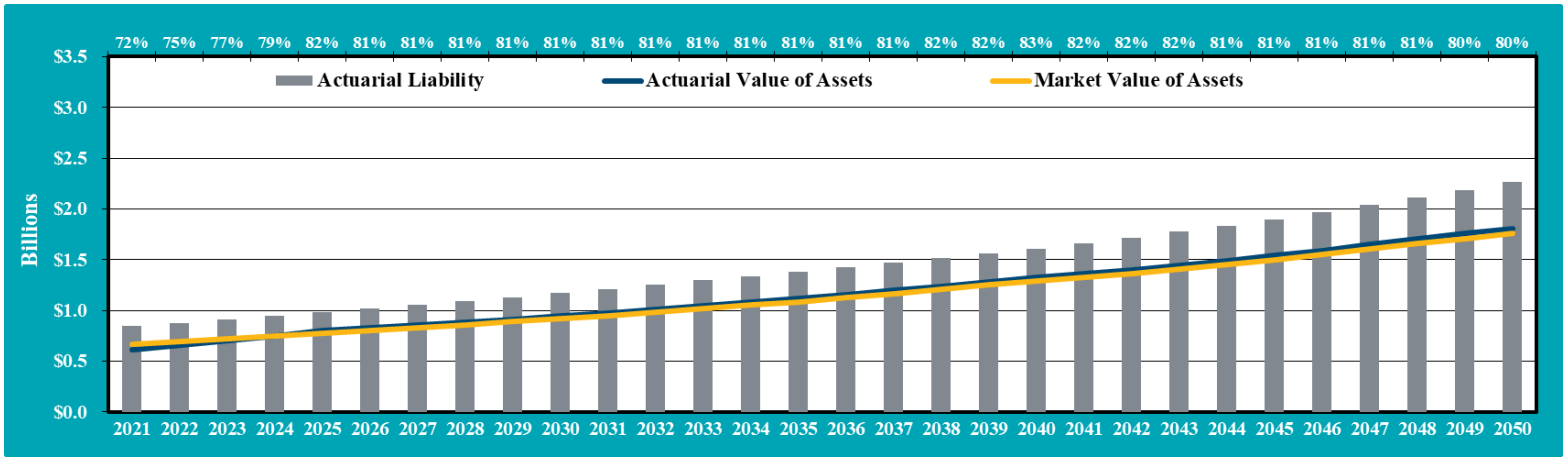
Optimistic Returns of 8.75%

If the fund earns 1.50% more than the assumed rate of return, the funded ratio will increase to 145% over the next 30 years.



Pessimistic Returns of 5.75%

If the fund earns 1.50% less than the assumed rate of return, the funded ratio will only increase to 80% over the next 30 years.



SECTION I – BOARD SUMMARY

3. 30-Year Projections Based on City Contribution Policy:

The following chart shows a 30-year cost projection under a 30-year closed amortization policy beginning May 1, 2014 which is the current City contribution policy. For the purpose of these projections, it has been assumed that the active population remains constant and the fund earns the assumed return of 7.25% per year on market value.

City of Kansas City, Missouri Firefighters' Pension System
Projection Based on April 30, 2021 Actuarial Valuation
30-Year Closed Amortization from May 1, 2014
Interest at 7.25%
Amounts in thousands

Valuation as of April 30, (1)	Employer Contribution Rate (2)	Member Contribution Rate (3)	Compensation at Valuation (4)	Employer Contribution (5)	Actuarial Liability (AL) (6)	Actuarial Value of Assets (AVA) (7)	Unfunded AL (8)	UAL Amortization Payment Rate (9)	Normal Cost Rate (10)	Administrative Expense Rate (11)	Employer ADC (12)	Dollar Amount of ADC (13)	Funded Ratio Using AVA (14)
2021	38.47%	10.55%	$ 70,005	$ 26,931	$ 845,939	$ 610,549	$ 235,390	22.49%	14.71%	0.45%	37.65%	$ 26,357	72.2%
2022	37.65%	10.55%	$ 72,105	$ 27,148	$ 878,606	$ 659,571	$ 219,035	20.88%	14.65%	0.45%	35.98%	$ 25,943	75.1%
2023	35.98%	10.55%	$ 74,268	$ 26,722	$ 912,254	$ 707,741	$ 204,512	19.49%	14.59%	0.45%	34.53%	$ 25,648	77.6%
2024	34.53%	10.55%	$ 76,496	$ 26,414	$ 946,607	$ 759,011	$ 187,596	17.91%	14.54%	0.45%	32.90%	$ 25,166	80.2%
2025	32.90%	10.55%	$ 78,791	$ 25,922	$ 981,763	$ 821,352	$ 160,411	15.38%	14.48%	0.45%	30.31%	$ 23,884	83.7%
2026	30.31%	10.55%	$ 81,155	$ 24,598	$ 1,017,781	$ 860,400	$ 157,381	15.19%	14.43%	0.45%	30.07%	$ 24,405	84.5%
2027	30.07%	10.55%	$ 83,590	$ 25,135	$ 1,054,853	$ 899,030	$ 155,823	15.19%	14.38%	0.45%	30.02%	$ 25,094	85.2%
2028	30.02%	10.55%	$ 86,097	$ 25,846	$ 1,092,925	$ 938,996	$ 153,929	15.20%	14.33%	0.45%	29.98%	$ 25,813	85.9%
2029	29.98%	10.55%	$ 88,680	$ 26,586	$ 1,131,897	$ 980,396	$ 151,501	15.22%	14.27%	0.45%	29.94%	$ 26,551	86.6%
2030	29.94%	10.55%	$ 91,341	$ 27,347	$ 1,171,682	$ 1,023,208	$ 148,474	15.23%	14.22%	0.45%	29.90%	$ 27,309	87.3%
2031	29.90%	10.55%	$ 94,081	$ 28,130	$ 1,212,189	$ 1,067,398	$ 144,791	15.25%	14.16%	0.45%	29.85%	$ 28,087	88.1%
2032	29.85%	10.55%	$ 96,903	$ 28,926	$ 1,253,419	$ 1,113,030	$ 140,389	15.26%	14.10%	0.45%	29.81%	$ 28,889	88.8%
2033	29.81%	10.55%	$ 99,810	$ 29,753	$ 1,295,353	$ 1,160,142	$ 135,211	15.28%	14.04%	0.45%	29.77%	$ 29,715	89.6%
2034	29.77%	10.55%	$ 102,805	$ 30,605	$ 1,337,718	$ 1,208,539	$ 129,178	15.30%	13.98%	0.45%	29.73%	$ 30,563	90.3%
2035	29.73%	10.55%	$ 105,889	$ 31,481	$ 1,380,567	$ 1,258,358	$ 122,209	15.32%	13.92%	0.45%	29.69%	$ 31,440	91.1%
2036	29.69%	10.55%	$ 109,065	$ 32,382	$ 1,424,103	$ 1,309,880	$ 114,223	15.35%	13.86%	0.45%	29.66%	$ 32,351	92.0%
2037	29.66%	10.55%	$ 112,337	$ 33,319	$ 1,468,565	$ 1,363,428	$ 105,136	15.38%	13.81%	0.45%	29.64%	$ 33,298	92.8%
2038	29.64%	10.55%	$ 115,707	$ 34,296	$ 1,514,204	$ 1,419,356	$ 94,848	15.41%	13.77%	0.45%	29.63%	$ 34,285	93.7%
2039	29.63%	10.55%	$ 119,179	$ 35,313	$ 1,561,498	$ 1,478,253	$ 83,245	15.46%	13.73%	0.45%	29.64%	$ 35,319	94.7%
2040	29.64%	10.55%	$ 122,754	$ 36,384	$ 1,610,736	$ 1,540,525	$ 70,211	15.51%	13.69%	0.45%	29.66%	$ 36,405	95.6%
2041	29.66%	10.55%	$ 126,437	$ 37,501	$ 1,662,338	$ 1,606,736	$ 55,602	15.59%	13.66%	0.45%	29.71%	$ 37,559	96.7%
2042	29.71%	10.55%	$ 130,230	$ 38,691	$ 1,716,895	$ 1,677,619	$ 39,277	15.72%	13.64%	0.45%	29.81%	$ 38,827	97.7%
2043	29.81%	10.55%	$ 134,137	$ 39,986	$ 1,774,415	$ 1,753,357	$ 21,058	16.05%	13.62%	0.45%	30.11%	$ 40,391	98.8%
2044	30.11%	10.55%	$ 138,161	$ 41,600	$ 1,835,337	$ 1,834,623	$ 715	0.53%	13.60%	0.45%	14.58%	$ 20,140	100.0%
2045	14.58%	10.55%	$ 142,306	$ 20,748	$ 1,899,446	$ 1,921,661	$ (22,214)	-15.95%	13.58%	0.45%	0.00%	$ -	101.2%
2046	0.00%	10.55%	$ 146,575	$ -	$ 1,966,768	$ 1,991,396	$ (24,629)	-17.17%	13.57%	0.45%	0.00%	$ -	101.3%
2047	0.00%	10.55%	$ 150,972	$ -	$ 2,037,165	$ 2,042,291	$ (5,126)	-3.47%	13.57%	0.45%	10.55%	$ 15,923	100.3%
2048	10.55%	10.55%	$ 155,501	$ 16,405	$ 2,110,625	$ 2,094,207	$ 16,418	10.79%	13.56%	0.45%	24.80%	$ 38,571	99.2%
2049	24.80%	10.55%	$ 160,166	$ 39,721	$ 2,187,415	$ 2,164,230	$ 23,185	14.79%	13.56%	0.45%	28.81%	$ 46,137	98.9%
2050	28.81%	10.55%	$ 164,971	$ 47,528	$ 2,268,179	$ 2,261,209	$ 6,969	4.32%	13.56%	0.45%	18.33%	$ 30,236	99.7%
2051	18.33%	10.55%	$ 169,920	$ 31,146	$ 2,353,508	$ 2,371,319	$ (17,810)	-10.71%	13.56%	0.45%	3.30%	$ 5,602	100.8%

SECTION II – DISCLOSURES RELATED TO RISK

Actuarial valuations are based on a set of assumptions about the future economic and demographic experience. These assumptions represent a reasonable estimate of future experience, but the 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 FPS, 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 FPS 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 FPS is that the contributions needed to pay the benefits become unaffordable. While there are a number of factors that could lead to contribution amounts becoming unaffordable, we believe the primary risks 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.

Assessing Costs and Risks

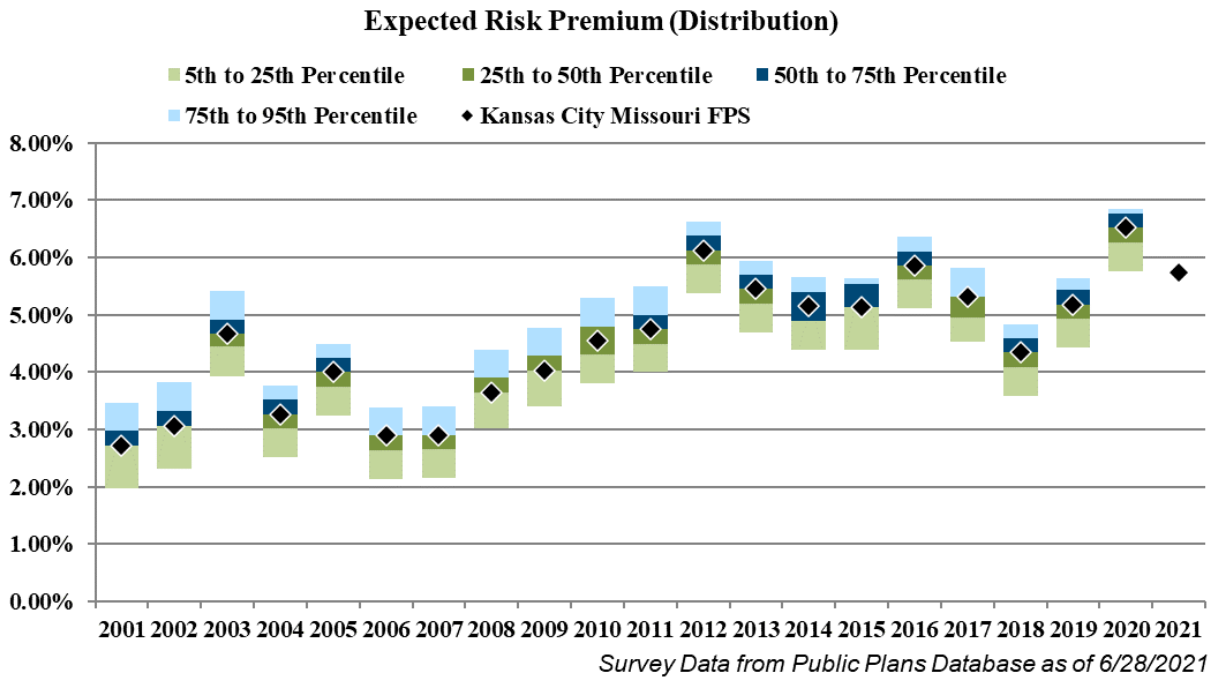
The fundamental risk to FPS is that the contributions needed to fund the benefits become unaffordable. Assessing this risk, however, is complex because there is no bright line of what is unaffordable and the contribution amounts themselves are affected not just by the experience of FPS, but also by the interaction of that experience and decisions by the Board related to assumptions, asset smoothing methods, and amortization periods.

Investment Risk is the potential for investment returns to be different than expected. Lower investment returns than anticipated will increase the unfunded actuarial liability 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 FPS'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. The chart on page 16 shows the effect that investment volatility has had on changes in the UAL, as the AVA Investment (G)/L.

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 amount of a plan's investment risk can be defined as the risk premium. The risk premium is the excess of a plan's assumed interest rate over a risk-free interest rate. The chart below shows the historical risk premium taken by plan sponsors (defined

SECTION II – DISCLOSURES RELATED TO RISK

as the excess of a plan's interest rate over a 10-year Treasury security). 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. Over time, the risk premium for FPS has increased in absolute terms.

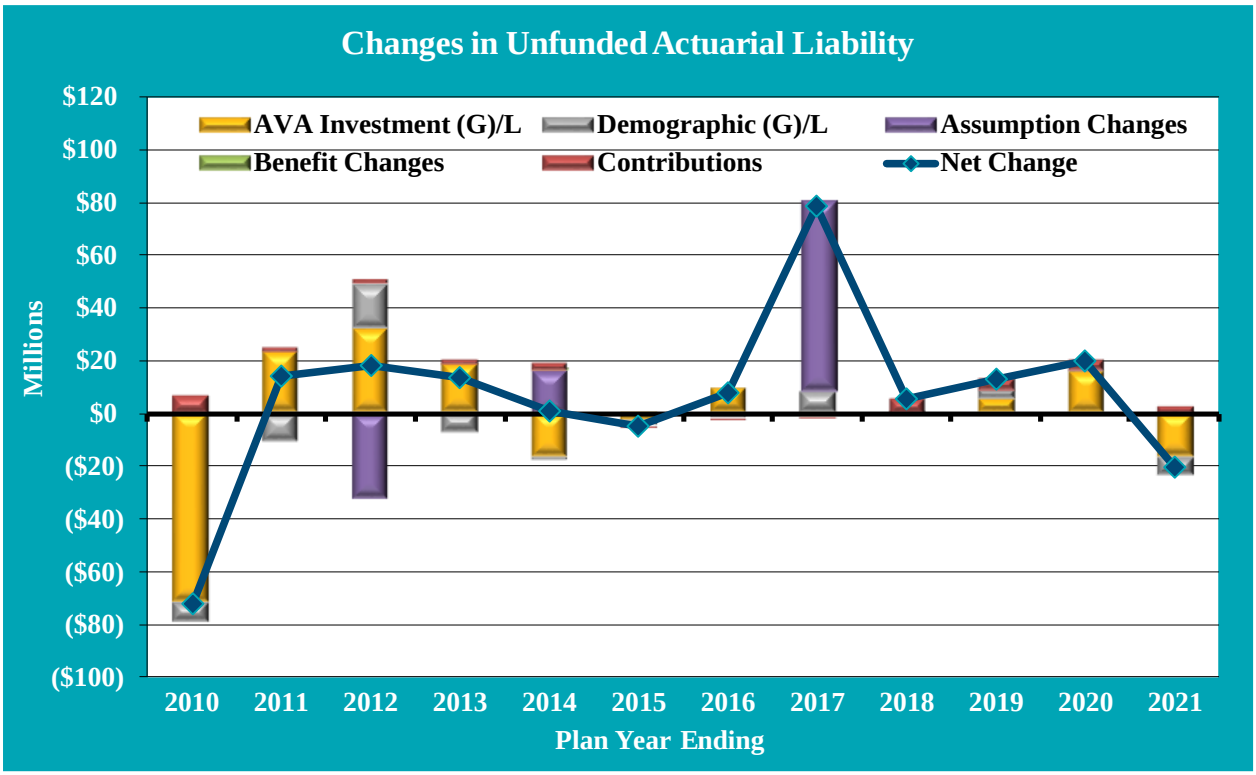


Longevity and other demographic risks are the potentials for mortality or other demographic experience to be different than expected. Generally, longevity and other demographic risks emerge slowly over time and are often dwarfed by other changes, particularly those due to investment returns. The next chart shows the demographic gains and losses over the last ten years compared to the total change in the UAL for each year. Note that the Demographic (G)/L is relatively small compared to other sources.

Assumption change risk is the potential for the economic and work environment to change such that future valuation assumptions are different than the current assumptions. For example, declines in interest rates over the last three decades resulted in higher investment returns for fixed-income investments but lower expected future returns necessitating either a change in investment policy, a reduction in the discount rate, or some combination of the two. 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.

As shown in the next chart, changes in assumptions over the years have sometimes increased and sometimes decreased the UAL. It is important to note that these changes simply reflect revisions

to estimates of future plan experience and ultimately costs will be determined by actual plan experience. The most recent assumption change increase in the UAL was primarily due to adopting new mortality tables. With the continued low-interest rate environment, we are continuing to see investment consultants reduce their capital market assumptions. As a result, future expectations of investment returns may continue to decline necessitating further reductions in the discount rate and resulting increases in the UAL.



Plan Maturity Measures

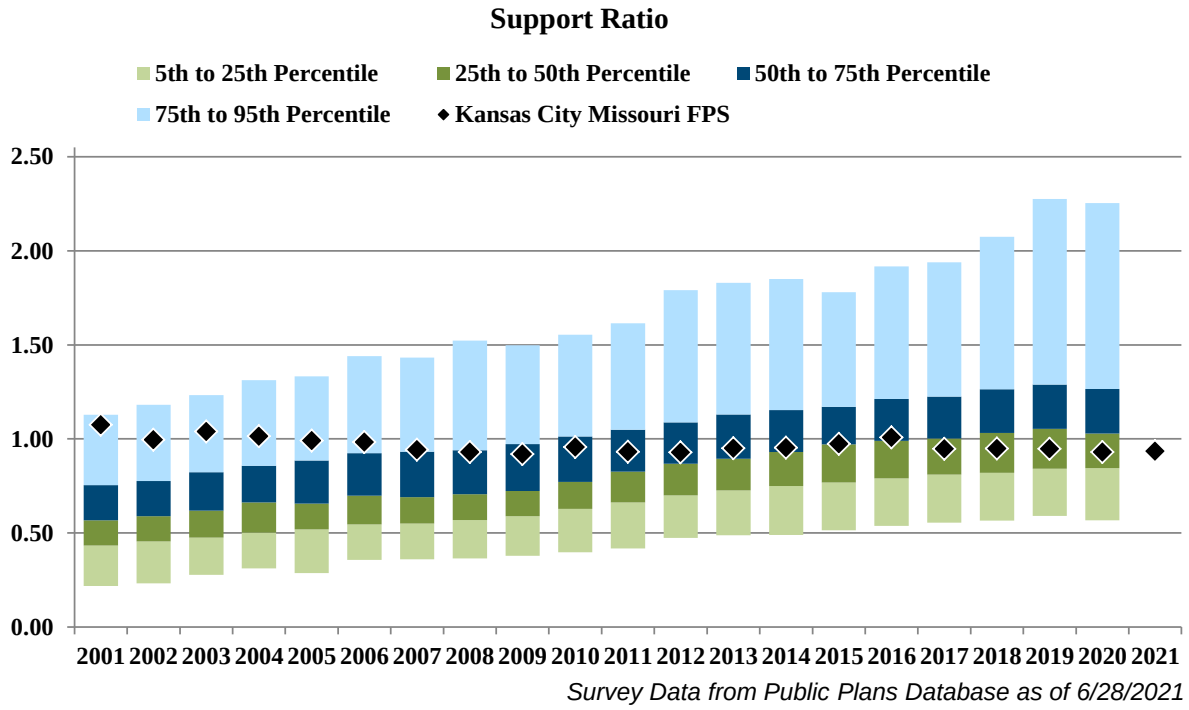
The future financial condition of a mature pension plan is more sensitive to each of the risks identified above than a less mature plan. Before assessing each of these risks, it is important to understand the maturity of FPS compared to other plans and how the maturity has changed over time.

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 following measures have been selected as the most important in understanding the primary risks identified for FPS.

SECTION II – DISCLOSURES RELATED TO RISK

Support Ratio (Inactives per Active)

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. The revenue base supporting the plan is usually proportional to the number of active members, so a relatively high number of inactives compared to actives may indicate a larger plan relative to its revenue base as well. Details regarding the FPS support ratio are shown in the chart on page 9.



Survey Data from Public Plans Database as of 6/28/2021

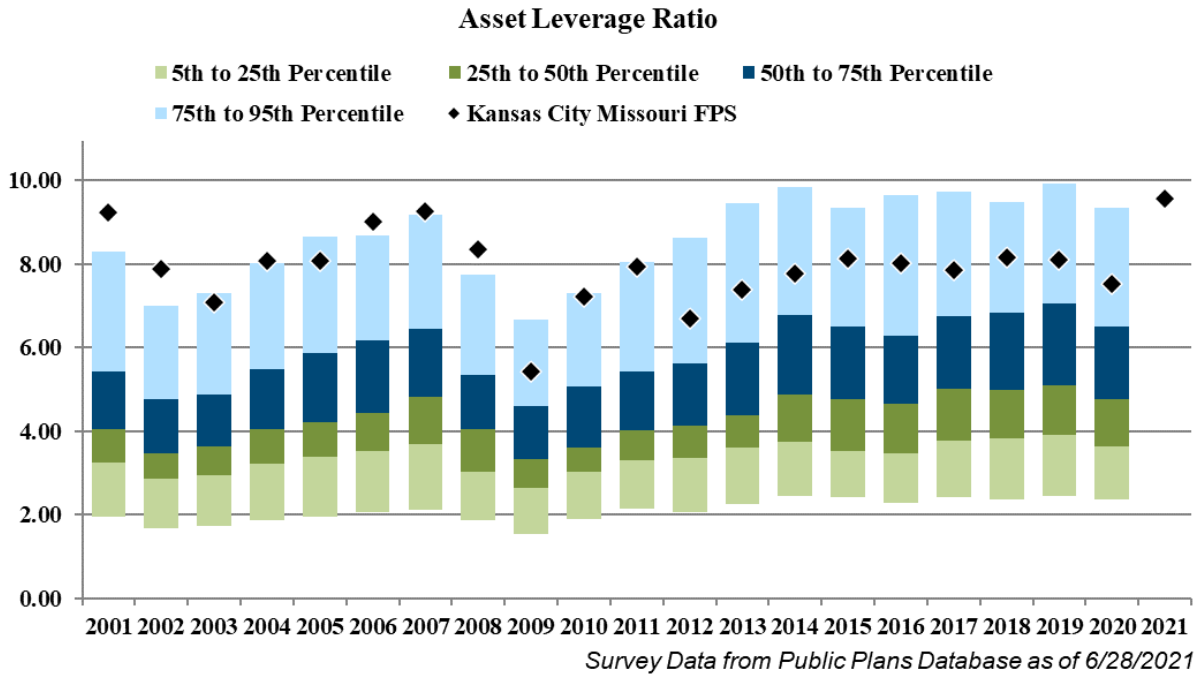
The chart above shows the distribution from the 5th percentile to the 95th percentile of support ratios for the plans in the Public Plan Database. The black diamond shows how FPS compares to the plans in the Public Plans Database. FPS is now in the lower quartiles of plans in the Public Plans Database. Also, whereas the support ratios for other plans in the database have been increasing during the period shown, the support ratio for FPS has remained relatively constant. This means relative to other plans in the database, FPS may be able to better handle risks since it is relatively less mature.

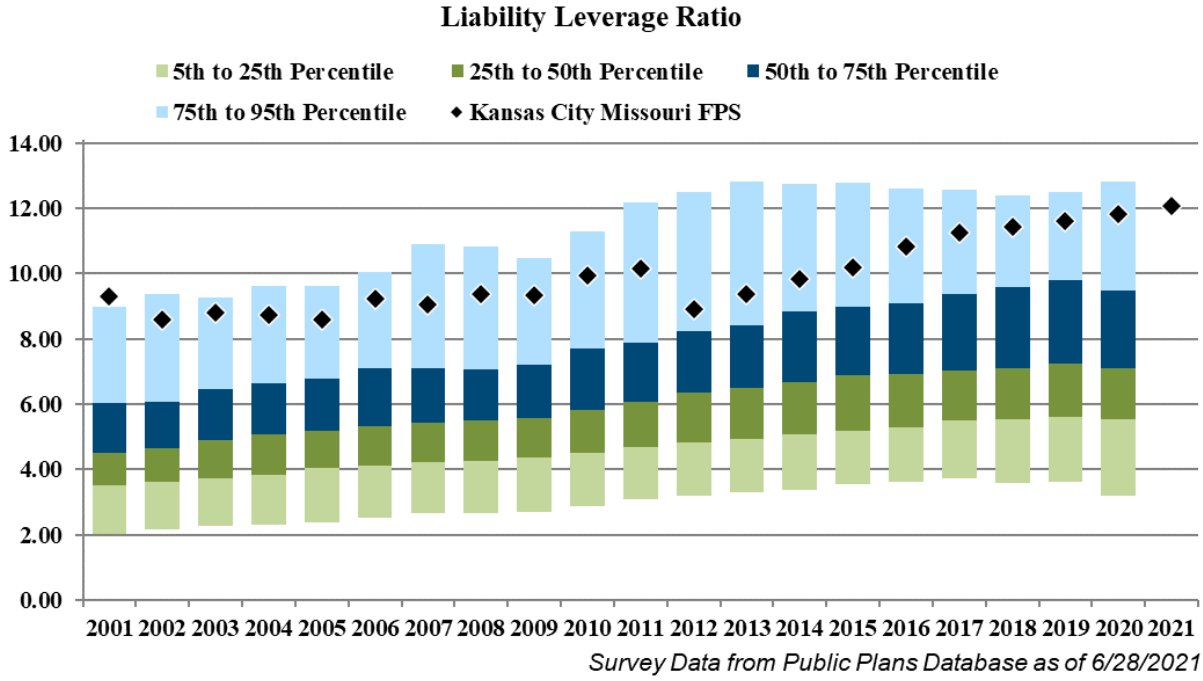
Leverage Ratios

Leverage or volatility ratios measure the size of the plan compared to its revenue base more directly. An asset leverage ratio of 7.5, for example, means that if FPS experiences a 10% loss on assets compared to the expected return, the loss would be equivalent to 75% of payroll. The same investment loss for a plan with an asset leverage ratio of 10.0 would be equivalent to 100% of payroll.

SECTION II – DISCLOSURES RELATED TO RISK

As FPS becomes better funded, the asset leverage ratio will increase, and if it was 100% funded, the leverage ratio would equal the Actuarial Liability (AL) leverage ratio. The AL leverage ratio also indicates how sensitive FPS is to experience gains and losses or assumption changes. For example, an assumption change that increases the AL by 5% would add a liability equivalent to about 60% of payroll if the AL leverage ratio is 12.0.



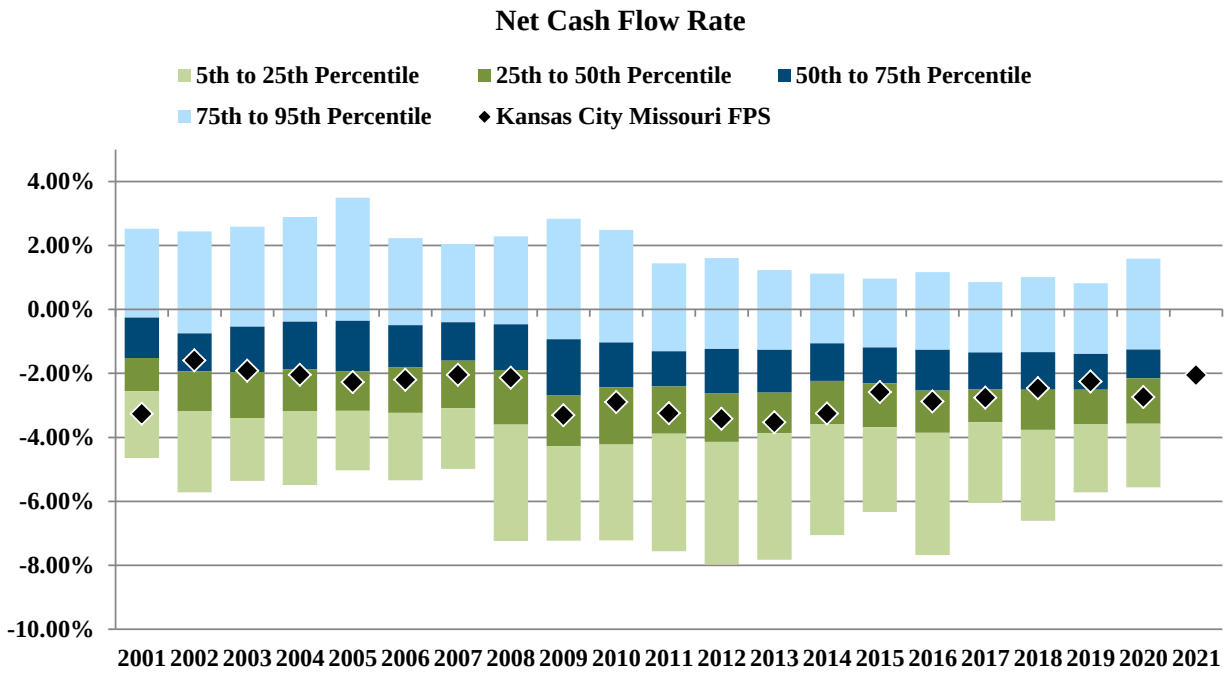


SECTION II – DISCLOSURES RELATED TO RISK

The previous charts show the distribution from the 5th percentile to the 95th percentile of Market Value of Assets and Actuarial Liability leverage ratios for the plans in the Public Plan Database. The black diamond shows how the FPS plan compares to the plans in the Public Plans Database. Since the black diamond is in the 75th to 95th percentile, this measure indicates a higher degree of risk for FPS compared to the majority of plans in the database.

Net Cash Flow

The net cash flow of the Plan as a percentage of the beginning of year assets indicates the sensitivity of the Plan to short-term investment returns. Net cash flow is equal to contributions less benefit payments and administrative expenses. Mature plans can have large amounts of benefit payments compared to contributions, particularly if they are well funded. 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.



Survey Data from Public Plans Database as of 6/28/2021

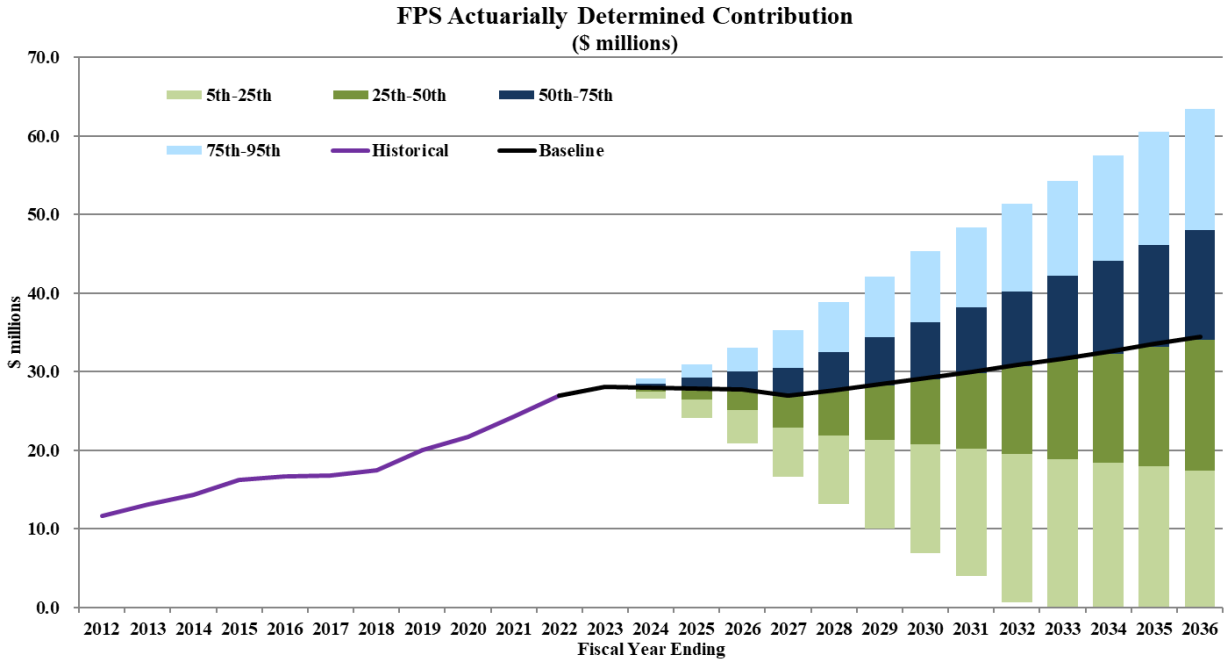
The chart above shows the distribution from the 5th percentile to the 95th percentile of Net Cash Flow for the plans in the Public Plan Database. In this case, a lower number (larger negative value) means the plan is more mature and is more susceptible to the impact of volatility on the asset returns. The black diamond shows how the FPS plan compares to the plans in the Public Plans Database, which is generally below the median.

SECTION II – DISCLOSURES RELATED TO RISK

Stochastic Projections

If experience has taught us anything, it is that there is a significant level of uncertainty in projections of the future. The largest source of uncertainty is the projection of investment returns. In order to better understand the potential impact of investment returns on FPS, we have included a stochastic projection of future actuarially determined contributions in this section of the report. The stochastic projections assume a geometric return of 7.25% and a standard deviation of 10.05% (based on the system's investment consultant's (ACG) capital market assumptions for FPS's target investment portfolio). Each projection contains 10,000 trials that are 15 years in length.

The chart below shows the historical and stochastic projection of contribution amounts for FPS. The purple line represents the amounts paid historically, and the black line shows the projected contribution amount for each year if all assumptions are met. The colored ranges represent different percentiles of the 10,000 trials. This range is intended to convey the degree of uncertainty in the projections based on future investment returns.



The chart shows a wide range of potential contributions depending on actual investment returns. The range between the 5th and 95th percentile produced from the 2036 valuation is from a contribution of $0 million to a contribution of over $63 million. This range is largely driven by the standard deviation of the investment portfolio of 10.05%. It should be noted that if we used ACG's median expected return of 5.83% based on their intermediate-term capital market assumptions, rather than FPS's assumption of 7.25%, each of these contribution ranges would be considerably higher.

SECTION II – DISCLOSURES RELATED TO RISK

More Detailed Assessment

Risk is a complex topic and the analysis above was limited by the scope of our assignment. We have not performed a more detailed assessment; however, we believe such an assessment would enhance the FPS's understanding of these risks significantly, enabling more informed judgments about how to manage these risks.

A total plan review was recently performed by the FPS investment consultant. Therefore, further analysis may not be warranted at this time.

SECTION III – ASSETS

Pension System 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, City contributions, and the ultimate security of participants' benefits.

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

- **Disclosure** of the System's assets as of April 30, 2020 and April 30, 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 flow** for the next 10 years.

Disclosure

There are two types of asset values disclosed in the valuation, the market value of assets and the actuarial value of assets. The market value represents "snap-shot" or "cash-out" values that provide 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 year-to-year budgeting as are the actuarial value of assets which reflect the smoothing of annual investment returns.

Table III-1 below discloses and compares each asset value as of April 30, 2020 and April 30, 2021.

Table III-1
Statement of Assets at Market Value as of April 30,

Assets	2020	2021	% Change
Cash	$ 10,913,500	$ 18,073,385	65.6%
Stock and Collective Trusts	468,128,942	655,737,982	40.1%
Accounts Receivable	48,829,011	555,208	(98.9%)
Interest and Dividends Receivable	269,271	463,552	72.2%
Contributions Receivable	1,670,798	696,716	(58.3%)
Expenses Payable	(518,912)	(744,059)	43.4%
Purchase of Investments	(1,142,428)	(627,787)	(45.0%)
Health Assets	(3,425,511)	(4,608,539)	34.5%
Market Value of Assets	**$ 524,724,671**	**$ 669,546,458**	27.6%

SECTION III – ASSETS

Changes in Market Value

Table III-2 below shows the components of change between the market value of assets as of April 30, 2020 and April 30, 2021.

Table III-2
Changes in Market Values

Value of Assets – April 30, 2020		**$ 524,724,671**
Additions		
Member Contributions	$ 7,413,942	
Employer Contributions	24,258,707	
Interest and Dividends	6,323,917	
Investment Return	155,075,352	
Total Additions	**$ 193,071,918**	
Deductions		
Benefit Payments	$ (45,147,209)	
Investment Expenses	(2,822,503)	
Administrative Expenses	(280,419)	
Total Deductions	**$ (48,250,131)**	
Value of Assets – April 30, 2021		**$ 669,546,458**

SECTION III – ASSETS

Actuarial Value of Assets

The next table, Table III-3, shows how the actuarial value of assets is developed.

A preliminary actuarial value of assets is calculated as the sum of the beginning of the year actuarial value of assets, the net new money, and the expected return on an actuarial basis. The gains and losses over the last four years are recognized over the next five-year period. The gain or loss of each year is the excess of market value of assets over the preliminary value of assets, minus the sum of the unrecognized gains and losses from each of the four years. Finally, an adjustment is made so that the final actuarial value of assets is at least 80% but no more than 120% of the market value.

Table III-3
Development of Actuarial Value of Assets

1.	**Actuarial Value of Assets at May 1, 2020**	**$ 566,945,184**
2.	Employer and Employee Contributions	31,672,649
3.	Benefit Payments and Administrative Expenses	(45,427,628)
4.	Net Cash Flow (2+3)	$ (13,754,979)
5.	Expected Value of investment return at 7.25%	40,613,632
6.	Actual investment return on Market Value	158,576,766
7.	Investment gain/(loss) for the year (6-5)	$ 117,963,134
8.	Investment gain/(loss) from current and prior years to be recognized in the plan year ending April 30, 2021	

Plan Year End	Total Gain/ (Loss)	Deferral Percentage	Deferred to Future Years
April 30, 2021	$ 117,963,134	80%	$ 94,370,507
April 30, 2020	(53,021,519)	60%	(31,812,911)
April 30, 2019	(14,079,579)	40%	(5,631,832)
April 30, 2018	10,360,755	20%	2,072,151
April 30, 2017	22,500,733	0%	0
Total	$ 83,723,524		$ 58,997,915

9.	Market Value of Assets for Year ending April 30, 2021	$ 669,546,458
10.	Preliminary Actuarial Value of Assets on May 1, 2021 (9 - 8 deferred)	610,548,543
11.	120% of MV, Upper Limit for Actuarial Value	$ 803,455,750
12.	80% of MV, Lower Limit for Actuarial Value	535,637,166
13.	**Actuarial Value of Assets on May 1, 2021**	**$ 610,548,543**

SECTION III – ASSETS

Investment Performance

The market value of assets (MVA) returned 30.62% during the plan year ending 2021, which is higher than the assumed 7.25% return. The actuarial value of assets (AVA) returned 10.24% during the plan year ending 2021.

The following table shows a history of the annual asset returns.

Table III-4
Historical Asset Returns

Fiscal Year Ending April 30,	Return on Market Value	Return on Actuarial Value	Assumed Return
2012	0.86%	0.33%	7.75%
2013	11.27%	3.27%	7.75%
2014	10.73%	11.79%	7.75%
2015	7.16%	8.12%	7.50%
2016	-1.61%	5.50%	7.50%
2017	12.89%	7.71%	7.50%
2018	9.40%	7.36%	7.25%
2019	4.56%	6.31%	7.25%
2020	-2.41%	4.44%	7.25%
2021	30.62%	10.24%	7.25%
5-Year Average	10.48%	7.20%	
10-Year Average	7.99%	6.46%	

SECTION III – ASSETS

Projection of Plan's Future Cash Flows

Table III-5
Projection of Plan's Expected Cash Flows ($ thousands)

Year Beginning May 1,	Benefits and Expenses	Expected Contributions*	Net Cash Flow
2021	$ (45,676)	$ 34,316	$ (11,360)
2022	(47,510)	35,728	(11,782)
2023	(49,700)	35,797	(13,903)
2024	(51,856)	35,961	(15,895)
2025	(54,029)	36,015	(18,014)
2026	(56,092)	35,489	(20,603)
2027	(58,301)	36,412	(21,889)
2028	(60,689)	37,452	(23,237)
2029	(63,237)	38,532	(24,705)
2030	(65,945)	39,633	(26,312)

* *Expected contributions include City contributions and Member contributions. City contributions are projected under the Board's funding policy assuming future market value returns of 7.25% as shown in the table on page 10.*

SECTION IV – LIABILITIES

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

- **Disclosure** of the System's liabilities at May 1, 2020 and May 1, 2021,
- Statement of **changes** in these liabilities 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 Future Benefits:** Used for measuring all future System obligations, represents the amount of money needed today to fund all benefits of the System both earned as of the valuation date and those to be earned in the future by current plan participants, under the current plan provisions.

- **Actuarial Liability:** Used for funding calculations, this liability is calculated taking the present value of benefits and subtracting the present value of future member contributions and future employer normal costs under an acceptable actuarial funding method. This method is referred to as the **Entry Age Normal** funding method.

- **Present Value of Accrued Benefits:** Used for communicating the current level of liabilities, this liability represents the total amount of money needed today to fund the current accrued obligations of the System, assuming no future accruals of benefits.

None of these liabilities are appropriate for measuring the cost of settlement of plan liabilities either by the purchase of annuities or payment of 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**.

SECTION IV – LIABILITIES

Table IV-1
Liabilities Net (Surplus)/Unfunded

	May 1, 2020	May 1, 2021
Present Value of Future Benefits		
Active Participant Benefits	$ 501,900,614	$ 507,102,798
Retiree and Inactive Benefits	495,662,113	513,800,281
Present Value of Future Benefits (PVB)	$ 997,562,727	$ 1,020,903,079
Actuarial Liability		
Present Value of Future Benefits (PVB)	$ 997,562,727	$ 1,020,903,079
Present Value of Future Normal Costs (PVFNC)	175,136,031	174,964,565
Actuarial Liability (AL = PVB – PVFNC)	822,426,696	845,938,514
Actuarial Value of Assets (AVA)	566,945,184	610,548,543
Net (Surplus)/Unfunded (AL – AVA)	$ 255,481,512	$ 235,389,971
Present Value of Accrued Benefits		
Present Value of Future Benefits (PVB)	$ 997,562,727	$ 1,020,903,079
Present Value of Future Benefit Accruals (PVFBA)	237,928,751	232,714,803
Present Value of Accrued Benefits (PVAB = PVB – PVFBA)	759,633,976	788,188,276
Market Value of Assets (MVA)	524,724,671	669,546,458
Net Unfunded/(Surplus)	$ 234,909,305	$ 118,641,818

SECTION IV – LIABILITIES

Changes in Liabilities

Each of the Liabilities disclosed in the prior table is 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
- Plan amendments increasing benefits
- Passage of time which adds interest to the prior liability
- Benefits paid to retirees since the last valuation
- Participants retiring, terminating, or dying at rates different than expected
- A change in actuarial or investment assumptions
- A change in the actuarial funding method

Unfunded liabilities will change because of all of the above, and also due to changes in system assets resulting from:

- Employer contributions different than expected
- Investment earnings different than expected
- A change in the method used to measure system 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 key changes in liabilities since the last valuation.

In the table that follows, we show the components of change in the actuarial liability between May 1, 2020 and May 1, 2021.

Table IV-2

	Actuarial Liability
Liabilities May 1, 2020	$ 822,426,696
Liabilities May 1, 2021	845,938,514
Liability Increase/(Decrease)	**23,511,818**
Change Due to:	
Plan Changes	$ 0
Assumption Changes	0
Actuarial (Gain)/Loss	(6,786,814)
Benefits Accumulated and Other Sources	30,298,632
Total Change	$ 23,511,818

SECTION IV – LIABILITIES

In addition, we breakdown the change in actuarial liability further by showing the total actuarial (gain)/loss by source, as shown in Table IV-3 below. A history of the (gain)/loss by source is shown in Table IV-4 below.

Table IV-3
(Gain)/Loss by Source as of May 1, 2021

Turnover	$ (754,000)
Retirement	(1,507,000)
Disability	(544,000)
Pre-retirement mortality	(1,126,000)
Post-retirement mortality	978,000
Salary increase more/(less) than expected for continuing actives	(7,469,000)
New entrants	468,000
Data Composition & Miscellaneous changes	3,167,000
Total (Gain)/Loss	**$ (6,787,000)**

Table IV-4
Historical Liability (Gains)/Losses ($ Millions)

Change due to:	2017	2018	2019	2020	2021
Turnover	$ 0.0	$ (0.8)	$ 0.0	$ (0.1)	$ (0.8)
Retirement	1.8	0.7	(0.1)	0.9	$ (1.5)
Disability	1.8	1.1	3.6	(0.2)	$ (0.5)
Pre-retirement mortality	(0.9)	0.0	0.1	0.1	$ (1.1)
Post-retirement mortality	0.0	(4.2)	2.0	(2.5)	$ 1.0
Salary change	6.0	2.0	(1.3)	(1.1)	$ (7.6)
New entrants	0.9	0.3	0.2	0.2	$ 0.5
Miscellaneous	(1.3)	1.0	(0.5)	3.4	$ 3.2
Total (Gain)/Loss	**$ 8.3**	**$ 0.1**	**$ 4.0**	**$ 0.7**	**$ (6.8)**

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 is the **Entry Age Actuarial Cost Method**. Under this method, there are three primary components to the total contribution: the **normal cost rate (employee and employer)**, the **administrative expense rate,** and the **unfunded actuarial liability rate** (UAL rate). The normal cost rate is determined by taking the value, as of entry age into the System, of each member's projected future benefits. This value is then divided by the value, also at entry age, of each member's expected future salary. The normal cost rate is multiplied by the current salary to determine each member's normal cost rate. Finally, the total normal cost rate is reduced by the member contribution rate to produce the employer's normal cost rate. The difference between the Entry Age actuarial liability and the actuarial value of assets is the unfunded actuarial liability.

Contributions are calculated on two bases:

- Under the Board's funding policy for calculating the Actuarially Determined Contribution, the unfunded actuarial liability is amortized using a 30-year layered amortization method – level percent of pay. Under the layered approach, the May 1, 2008 unfunded actuarial liability is written down over a 30-year period and all future changes to the unfunded actuarial liability establish new 30-year amortization periods. Payroll is expected to increase 3.0% per year.

- Under the City ordinance, the City's contributions are to be based upon a 30-year closed amortization of the entire unfunded liability from May 1, 2014 as a level percent of pay. Payroll is expected to increase 3.0% per year.

For both calculations, the increase in contribution rates due to the May 1, 2017 actuarial assumption changes has been phased-in over five years and is fully recognized as of the May 1, 2021 actuarial valuation.

SECTION V – CONTRIBUTIONS

Table V-1 below presents and compares the employer contribution rates for the System for this valuation and the prior one using both the Actuarially Determined Contribution under the current Board funding policy and the City ordinance, using a 30-year closed amortization method.

Table V-1
Employer Contribution Rate

	May 1, 2020	May 1, 2021
Actuarially Determined Contribution *		
Entry Age Normal Cost Rate	14.36%	14.71%
Administrative Expense Rate	0.43%	0.45%
Amortization Payment	23.68%	23.84%
Actuarially Determined Contribution	38.47%	39.00%
City Ordinance *		
Entry Age Normal Cost Rate	14.36%	14.71%
Administrative Expense Rate	0.43%	0.45%
Amortization Payment	22.63%	22.49%
Actuarially Determined Contribution	37.42%	37.65%

** Rates reflect the 5-year phase-in of the 2017 assumption changes*

SECTION V – CONTRIBUTIONS

Table V-2 below presents the May 1, 2020 employer contribution rates for the System. The employer contribution rate is based on the amortization schedule shown in Table V-3. The employer contribution rates are then compared to what the City is expected to contribute for the current plan year. The current expected City contribution rate for all employees for the year ending April 30, 2022 is 38.47% of payroll.

Table V -2
Development of Plan Contribution Rate
as of May 1, 2021

		As % of Payroll*
1.	Normal Cost (Monthly):	
	a. Total Normal Cost	25.26%
	b. Administrative Expense	0.45%
	c. Expected Members Contribution	10.55%
	d. Employer Paid Normal Cost (a) + (b) - (c)	15.16%
2.	Amortization of Unfunded Liability	
	a. Actuarial Liability	$ 845,938,514
	b. Actuarial Value of Assets	610,548,543
	c. Unfunded Liability (a) - (b)	235,389,971
	d. Amortization of Unfunded Liability	23.84%
3.	Actuarially Determined Employer Contribution Rate for fiscal year ending April 30, 2023	39.00%
4.	Scheduled City Contributions for fiscal year ending April 30, 2022 (Prior Year's ADC)**	38.47%

* *Total payroll is $70,004,912, and the Actuarially Determined Contribution for plan year ending April 30, 2023 is $27,301,916.*

** *Determined in the May 1, 2020 valuation.*

SECTION V – CONTRIBUTIONS

Under Board funding policy, for purposes of calculating the Actuarially Determined Contribution under GASB, the Unfunded Actuarial Liability is amortized in accordance with the schedule below:

Initial unfunded actuarial liability (as of May 1, 2008)	30 years
Changes to the UAL on and after May 1, 2009	30 years

Table V-3
Unfunded Actuarial Liability Amortization Schedule

Item	Date Created	Initial Years	Initial Balance	Remaining Years	Outstanding Balance	Amortization Payment	Amortization Factor
Initial UAL	5/1/2008	30	$ 31,525,386	17	$ 32,737,909	$ 2,667,339	12.274
(Gain)/Loss*	5/1/2009	30	119,805,172	18	125,732,225	9,849,255	12.766
(Gain)/Loss*	5/1/2010	30	(72,293,282)	19	(76,434,224)	(5,773,764)	13.238
(Gain)/Loss*	5/1/2011	30	14,027,641	20	14,899,772	1,088,209	13.692
(Gain)/Loss*	5/1/2012	30	50,231,264	21	53,467,094	3,784,521	14.128
Assumption Change	5/1/2012	30	(32,090,739)	21	(34,157,981)	(2,417,779)	14.128
(Gain)/Loss*	5/1/2013	30	13,322,268	22	14,178,458	974,706	14.546
(Gain)/Loss*	5/1/2014	30	(15,478,970)	23	(16,437,879)	(1,099,644)	14.948
Assumption Change	5/1/2014	30	16,120,179	23	17,118,810	1,145,196	14.948
Plan Amendment	5/1/2014	30	212,181	23	225,326	15,074	14.948
(Gain)/Loss*	5/1/2015	30	(4,602,806)	24	(4,864,537)	(317,230)	15.334
(Gain)/Loss*	5/1/2016	30	7,691,151	25	8,076,692	514,270	15.705
(Gain)/Loss*	5/1/2017	30	7,063,910	26	7,359,995	458,248	16.061
Assumption Change**	5/1/2017	30	71,577,266	26	74,577,437	4,643,327	16.061
(Gain)/Loss*	5/1/2018	30	5,448,133	27	5,628,491	343,135	16.403
(Gain)/Loss*	5/1/2019	30	13,148,442	28	13,452,100	803,996	16.732
(Gain)/Loss*	5/1/2020	30	20,002,101	29	20,242,503	1,187,457	17.047
(Gain)/Loss*	5/1/2021	30	(20,412,220)	30	(20,412,220)	(1,176,509)	17.350
Total			**$ 225,297,077**		**$ 235,389,971**	**$ 16,689,807**	

**Also included differences between the Actuarially Determined Contribution and the actual contributions made.*

Under the City ordinance, amortization payments are calculated using a 30-year closed amortization method. The amortization payment as of May 1, 2021 is shown in the table below.

Table V-4
Unfunded Actuarial Liability Amortization Schedule

UAL	Remaining Years *	Amortization Payment	Amortization Factor
$235,389,971	23	$15,746,868	14.948

**30-year closed amortization period began 5/1/2014*

SECTION VI – FINANCIAL STATEMENT INFORMATION

The Government Finance Officers Association (GFOA) maintains a checklist of items to be included in a public retirement system's Comprehensive Annual Financial Report in order to receive recognition for excellence in financial reporting. Although the Kansas City Firefighters' Pension System does not issue a Comprehensive Annual Financial Report under GFOA guidelines, we have included certain schedules in this section for possible inclusion within the System's audited financial statements.

Tables VI-1 through VI-5 are exhibits that could be used with the Comprehensive Annual Financial Report. Table VI-1 is the Note to Required Supplementary Information, Table VI-2 is a history of gains and losses in actuarial liability, Table VI-3 is the Schedule of Funded Liabilities by Type which shows the portion of actuarial liability covered by assets, Table VI-4 shows historical Actuarially Determined Contribution information, compared to what the City actually contributed, and Table VI-5 is the Schedule of Funding Progress.

SECTION VI – FINANCIAL STATEMENT INFORMATION

Table VI-1
Note To Required Supplementary Information

The information presented in the required supplementary schedules was determined as part of the actuarial valuation at the date indicated. Additional information as of the latest actuarial valuation follows.

Valuation date	May 1, 2021
Actuarial cost method	Entry age
Amortization method	30-year layered amortization, level percent of pay for changes to the UAL on or after 5/1/2008
Remaining amortization period for the UAL	Weighted average of 20.9 years
Asset valuation method	5-year smoothed market
Actuarial assumptions:	
Investment rate of return	7.25%
Projected salary increases	Ranges from 8.0% to 3.0%
Cost-of-living adjustments	3.0% simple
Inflation	2.5%

The actuarial assumptions used have been based upon recommendations by the actuary and adopted by the System's Board of Trustees. The most recent actuarial experience study was performed for the period May 1, 2011 through April 30, 2016.

The rate of employer actuarially determined contributions to the System is composed of the normal cost, expected administrative expenses, and an amortization of the unfunded actuarial liability. The normal cost is a level percent of payroll cost which, along with member contributions, will pay for projected benefits at retirement for the average plan participant. The actuarial liability is that portion of the present value of projected benefits that will not be paid by future employer normal costs or member contributions. The difference between this liability and the actuarial value of assets as of the same date is the unfunded actuarial liability. The contribution rate change as a result of the revised assumptions adopted as of May 1, 2017 is phased-in over five years. As of May 1, 2021, the change is fully phased in.

SECTION VI – FINANCIAL STATEMENT INFORMATION

Table VI-2
Analysis Of Financial Experience
Gain and Loss in Actuarial Liability During Years Ended April 30
Resulting from Differences Between Assumed Experience and Actual Experience
Gain (or Loss) for Year ending April 30,
(expressed in thousands)

Type of Activity	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021
Investment Income *	$ (33,605)	$ (20,446)	$ 14,074	$ 3,033	$ (9,103)	$ 1,263	$ (5,369)	$ (9,196)	$ (19,269)	$ 13,625
Combined Liability Experience	(16,627)	7,124	1,405	1,570	1,412	(8,327)	(79)	(3,952)	(733)	6,787
Gain/(or Loss) during Year from Financial Experience	$ (50,232)	$ (13,322)	$ 15,479	$ 4,603	$ (7,691)	$ (7,064)	$ (5,448)	$ (13,148)	$ (20,002)	$ 20,412
Non-Recurring Gain/(or Loss) Items	32,091	0	(16,332)	0	0	(71,577)	0	0	0	0
Composite Gain/(or Loss) during Year	$ (18,141)	$ (13,322)	$ (853)	$ 4,603	$ (7,691)	$ (78,641)	$ (5,448)	$ (13,148)	$ (20,002)	$ 20,412

** Investment experience includes the differences in actual and recommended contributions.*

SECTION VI – FINANCIAL STATEMENT INFORMATION

Table VI-3
Schedule of Funded Liabilities by Type
Aggregate Actuarial Liabilities for
(expressed in thousands)

Valuation Date May 1,	Active Member Contributions (1)	Retirees & Beneficiaries (2)	Active Member Employer Financed Contributions (3)	Actuarial Value of Reported Assets	Portion of Actuarial Liabilities Covered by Reported Assets (1)	(2)	(3)
2012	$70,049	$311,907	$153,259	$420,337	100%	100%	25%
2013	$69,614	$333,764	$144,410	$418,712	100%	100%	11%
2014	$75,288	$346,493	$161,387	$452,378	100%	100%	19%
2015	$78,243	$363,896	$161,279	$476,356	100%	100%	21%
2016	$79,606	$388,599	$156,039	$488,879	100%	100%	13%
2017	$84,135	$437,176	$205,226	$512,041	100%	98%	0%
2018	$87,775	$453,880	$215,296	$535,935	100%	99%	0%
2019	$93,552	$468,766	$229,523	$556,898	100%	99%	0%
2020	$95,894	$495,662	$230,871	$566,945	100%	95%	0%
2021	$99,778	$513,800	$232,360	$610,549	100%	99%	0%

SECTION VI – FINANCIAL STATEMENT INFORMATION

Table VI-4
Schedule of City Contributions

Plan Year Ended April 30	Actuarially Determined Contribution	Actual Contribution	Percentage Contributed
2013	$15,400,040 *	$13,120,169	85.2%
2014	$16,182,139 *	$14,344,958	88.6%
2015	$16,182,139 **	$16,258,533	100.5%
2016	$16,581,464 **	$16,631,844	100.3%
2017	$16,726,994 **	$16,754,798	100.2%
2018	$17,316,499 **	$17,435,993	100.7%
2019	$19,747,524 **	$20,015,327	101.4%
2020	$21,562,471 **	$21,728,336	100.8%
2021	$23,981,922 **	$24,258,707	101.2%
2022	$26,803,906 **	--	--

**The actuarially determined contribution for the plan years ended April 30, 2013 through April 30, 2014 is based on the actuarially computed contribution for the valuation year.*

***For plan years ended April 30, 2015 and later, the actuarially determined contribution is based on the calculation for the prior valuation year using estimated valuation payroll. The actuarially computed contribution for the current valuation year is described in Section V, Table V-2.*

SECTION VI – FINANCIAL STATEMENT INFORMATION

Table VI-5
Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Liability (b)	Unfunded Actuarial Liability (b) - (a)	Funded Ratio (a) / (b)	Covered Payroll (c)	UAL as a Percentage of Covered Payroll* [(b) - (a)] / (c)
5/1/2012	$420,336,845	$535,215,109	$114,878,264	78.54%	$60,062,558	191.26%
5/1/2013	$418,711,963	$547,787,899	$129,075,936	76.44%	$58,356,072	221.19%
5/1/2014	$452,378,238	$583,167,922	$130,789,684	77.57%	$59,410,476	220.15%
5/1/2015	$476,356,399	$603,417,753	$127,061,354	78.94%	$59,294,555	214.29%
5/1/2016	$488,878,575	$624,244,469	$135,365,894	78.32%	$57,625,619	234.91%
5/1/2017	$512,040,758	$726,537,707	$214,496,949	70.48%	$64,492,241	332.59%
5/1/2018	$535,935,199	$756,950,736	$221,015,537	70.80%	$66,264,508	333.54%
5/1/2019	$556,897,913	$791,841,017	$234,943,104	70.33%	$68,246,790	344.26%
5/1/2020	$566,945,184	$822,426,696	$255,481,512	68.94%	$69,674,827	366.68%
5/1/2021	$610,548,543	$845,938,514	$235,389,971	72.17%	$70,004,912	336.25%

** Not less than zero.*

APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension System Table of Plan Coverage	5/1/2020	5/1/2021	% Change
Active Members in Valuation			
Tier 1			
Number	715	683	-4.48%
Average Age	44.72	45.49	1.72%
Average Service	18.49	19.21	3.89%
Total Payroll	55,529,665	$ 53,726,002	-3.25%
Average Anticipated Payroll	$ 77,664	$ 78,662	1.28%
Account Balance	$ 91,632,259	$ 94,059,068	2.65%
Eligible to Retire on:			
Voluntary Pension	141	152	7.80%
Deferred Pension	466	463	-0.64%
Total Active Vested Members	607	615	1.32%
Tier 2			
Participant Count	296	333	12.50%
Average Age	29.23	29.47	0.82%
Average Service	2.92	3.43	17.47%
Total Payroll	14,145,163	$ 16,278,911	15.08%
Average Anticipated Payroll	$ 47,788	$ 48,886	2.30%
Account Balance	$ 4,261,466	$ 5,719,204	34.21%
Eligible to Retire on:			
Voluntary Pension	0	0	N/A
Deferred Pension	0	0	N/A
Total Active Vested Members	0	0	N/A
Total			
Count	1,011	1,016	0.49%
Average Age	40.18	40.24	0.15%
Average Service	13.93	14.04	0.79%
Total Payroll	$ 69,674,827	$ 70,004,912	0.47%
Average Anticipated Payroll	$ 68,917	$ 68,902	-0.02%
Account Balance	$ 95,893,725	$ 99,778,273	4.05%
Eligible to Retire on:			
Voluntary Pension	141	152	7.80%
Deferred Pension	466	463	-0.64%
Total Active Vested Members	607	615	1.32%

APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension System Table of Plan Coverage (cont.)	5/1/2020	5/1/2021	% change
Vested Terminated Members	12	11	-8.33%
Deaths During the Plan Year	44	36	-18.18%
Pensioners:			
Number in Pay Status*			
Retirees	569	573	0.70%
Duty Disabled Retirees	113	114	0.88%
Non-duty Disabled Retirees	5	4	-20.00%
Total	**687**	**691**	0.58%
Average Age	67.17	67.03	-0.22%
Average Monthly Benefit***	$ 4,363	$ 4,489	2.89%
Beneficiaries in Pay Status**	241	248	2.90%
Members Due Refunds	13	25	92.31%
New Disabilities	5	2	-60.00%

** Disabled participants that were eligible for voluntary retirement at the time of their disability are valued as Retirees*

***Widows, QDROs, and Children*

****The monthly benefit does not include the health insurance subsidy benefits*

APPENDIX A – MEMBERSHIP INFORMATION

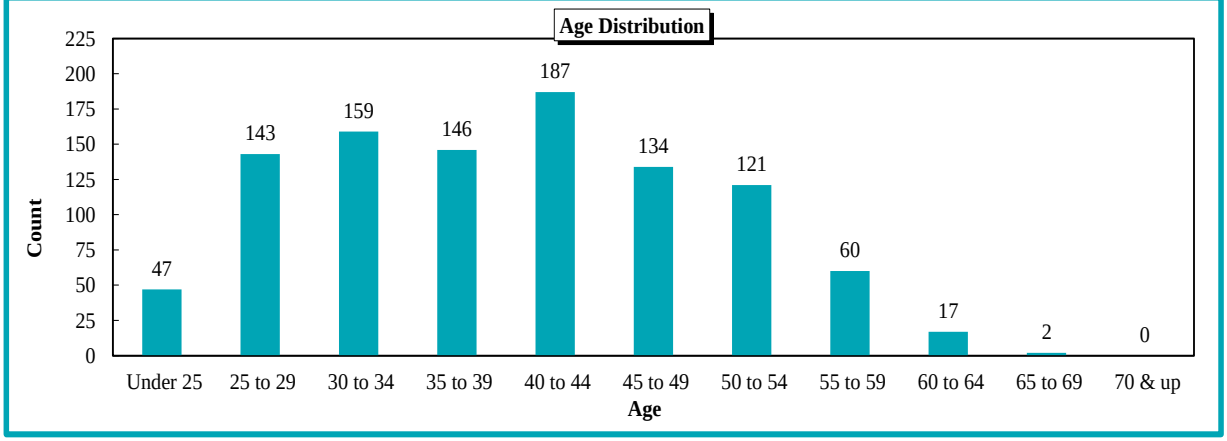
Kansas City Firefighters' Pension Plan Table of Plan Coverage (cont.)	May 1, 2020	May 1, 2021	% Change
Active Members in Valuation			
Count			
Males	978	982	0.41%
Females	33	34	3.03%
Total	1,011	1,016	0.49%
Average Current Age			
Males	40.19	40.31	0.30%
Females	40.01	38.27	-4.35%
Total	40.18	40.24	0.15%
Average Service			
Males	14.00	14.17	1.21%
Females	11.90	10.24	-13.95%
Total	13.93	14.04	0.79%
Vested Terminated Members			
Count			
Males	10	10	0.00%
Females	2	1	-50.00%
Total	12	11	-8.33%
Average Current Age			
Males	42.45	42.38	-0.16%
Females	48.63	49.09	0.95%
Total	43.48	42.99	-1.13%
Pensioners			
Count			
Males	669	669	0.00%
Females	18	22	22.22%
Total	687	691	0.58%
Average Current Age			
Males	67.43	67.34	-0.13%
Females	57.57	57.40	-0.30%
Total	67.17	67.02	-0.22%

APPENDIX A – MEMBERSHIP INFORMATION

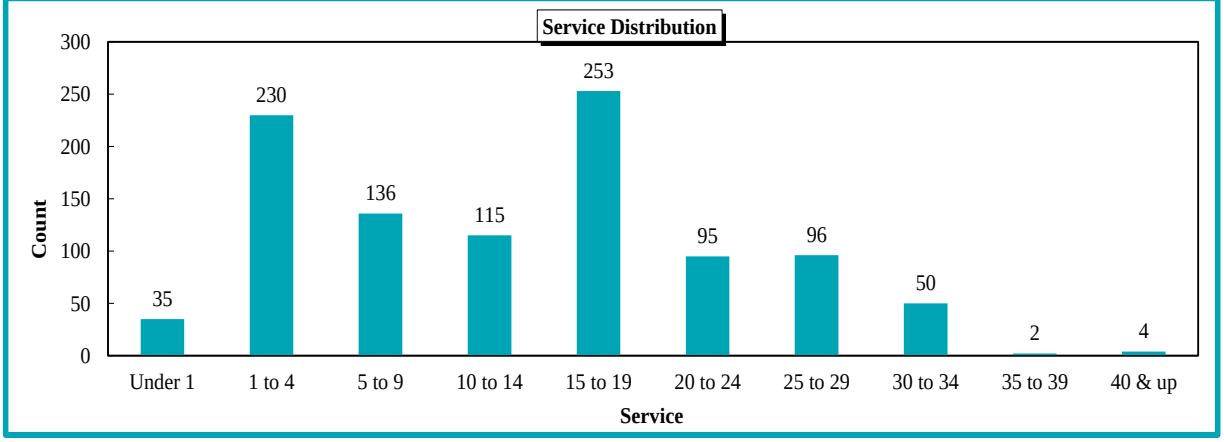
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2021
TOTAL
COUNTS BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	18	29	0	0	0	0	0	0	0	0	47
25 to 29	13	105	25	0	0	0	0	0	0	0	143
30 to 34	4	80	55	20	0	0	0	0	0	0	159
35 to 39	0	12	48	58	28	0	0	0	0	0	146
40 to 44	0	4	7	35	128	13	0	0	0	0	187
45 to 49	0	0	1	2	63	43	25	0	0	0	134
50 to 54	0	0	0	0	28	28	49	16	0	0	121
55 to 59	0	0	0	0	6	9	21	24	0	0	60
60 to 64	0	0	0	0	0	2	1	10	2	2	17
65 to 69	0	0	0	0	0	0	0	0	0	2	2
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	35	230	136	115	253	95	96	50	2	4	1,016

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2021
TOTAL



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2021
TOTAL

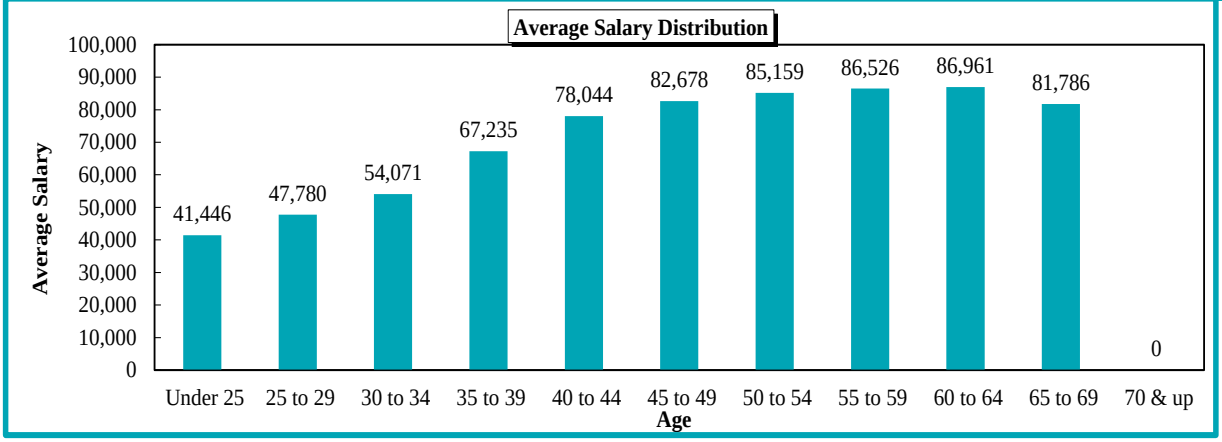


APPENDIX A – MEMBERSHIP INFORMATION

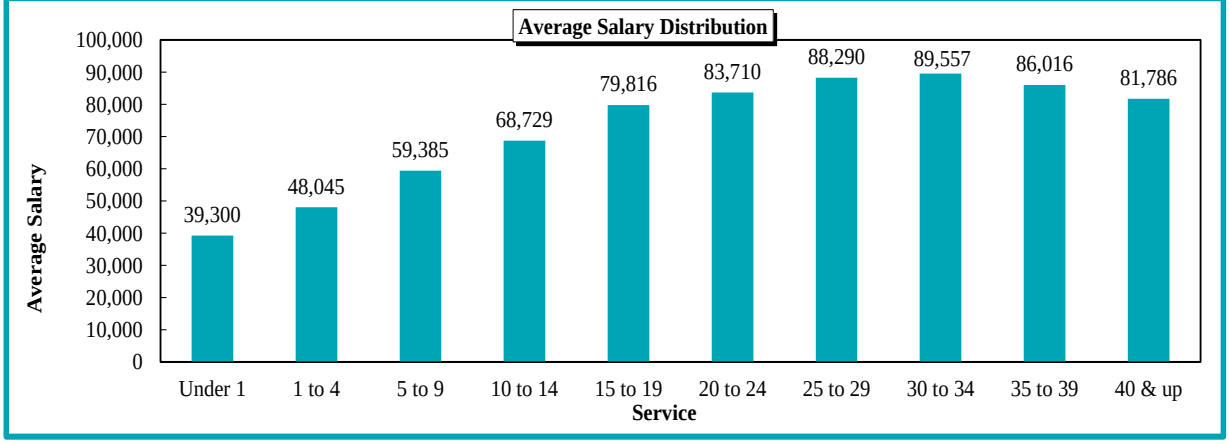
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2021
TOTAL
AVERAGE SALARY BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	38,541	43,249	0	0	0	0	0	0	0	0	41,446
25 to 29	38,542	47,205	54,997	0	0	0	0	0	0	0	47,780
30 to 34	45,183	48,635	58,441	65,574	0	0	0	0	0	0	54,071
35 to 39	0	56,018	60,734	68,507	80,554	0	0	0	0	0	67,235
40 to 44	0	69,129	70,637	70,651	80,191	83,539	0	0	0	0	78,044
45 to 49	0	0	77,556	73,104	79,491	83,579	90,132	0	0	0	82,678
50 to 54	0	0	0	0	78,690	85,859	88,444	85,196	0	0	85,159
55 to 59	0	0	0	0	77,048	79,267	85,846	92,212	0	0	86,526
60 to 64	0	0	0	0	0	77,556	86,016	90,161	86,016	81,786	86,961
65 to 69	0	0	0	0	0	0	0	0	0	81,786	81,786
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	39,300	48,045	59,385	68,729	79,816	83,710	88,290	89,557	86,016	81,786	68,902

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2021
TOTAL



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2021
TOTAL

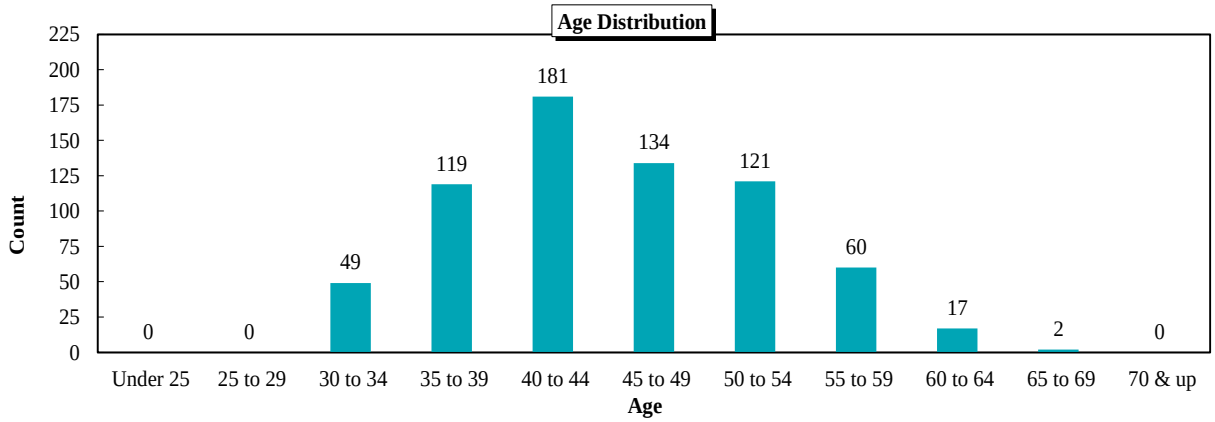


APPENDIX A – MEMBERSHIP INFORMATION

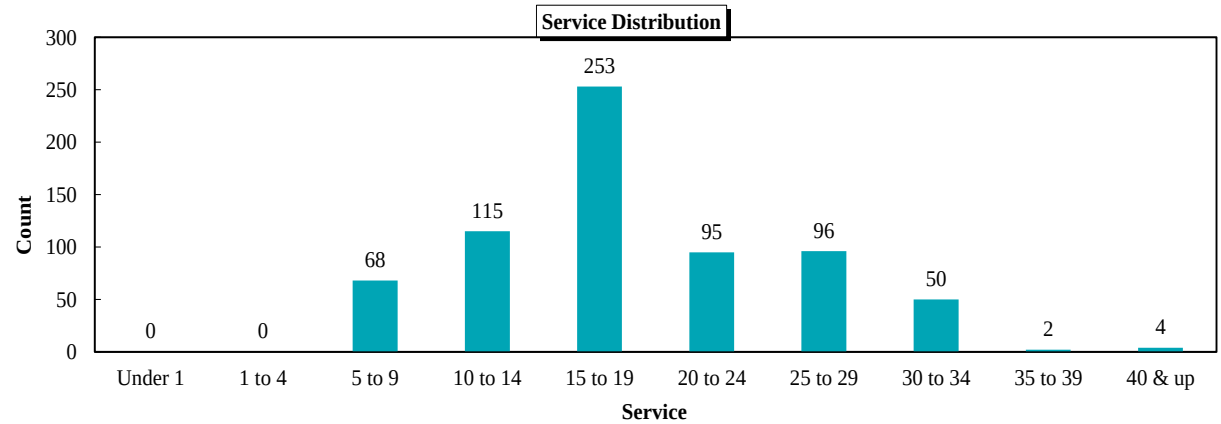
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2021
TIER 1
COUNTS BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	0	0	0	0	0	0	0	0	0	0	0
25 to 29	0	0	0	0	0	0	0	0	0	0	0
30 to 34	0	0	29	20	0	0	0	0	0	0	49
35 to 39	0	0	33	58	28	0	0	0	0	0	119
40 to 44	0	0	5	35	128	13	0	0	0	0	181
45 to 49	0	0	1	2	63	43	25	0	0	0	134
50 to 54	0	0	0	0	28	28	49	16	0	0	121
55 to 59	0	0	0	0	6	9	21	24	0	0	60
60 to 64	0	0	0	0	0	2	1	10	2	2	17
65 to 69	0	0	0	0	0	0	0	0	0	2	2
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	68	115	253	95	96	50	2	4	683

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2021
TIER 1



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2021
TIER 1

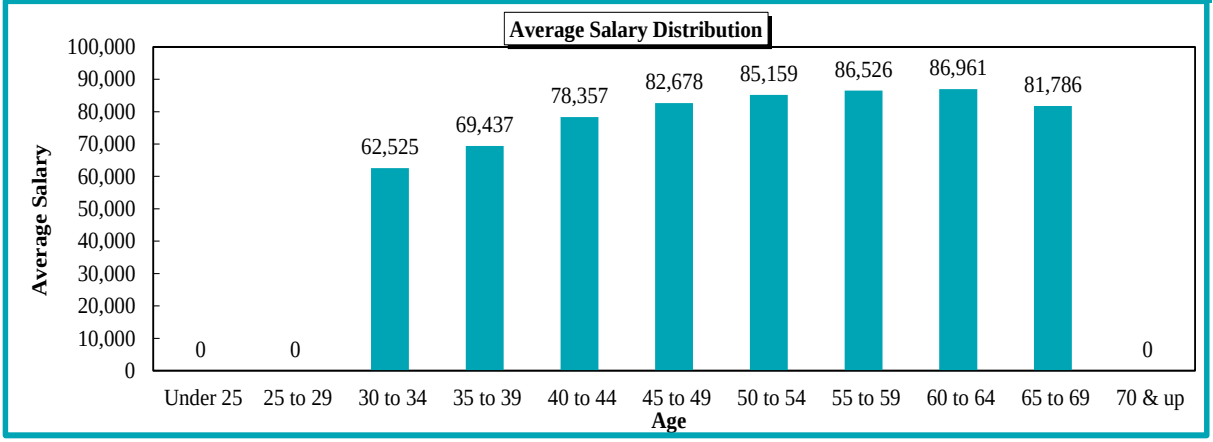


APPENDIX A – MEMBERSHIP INFORMATION

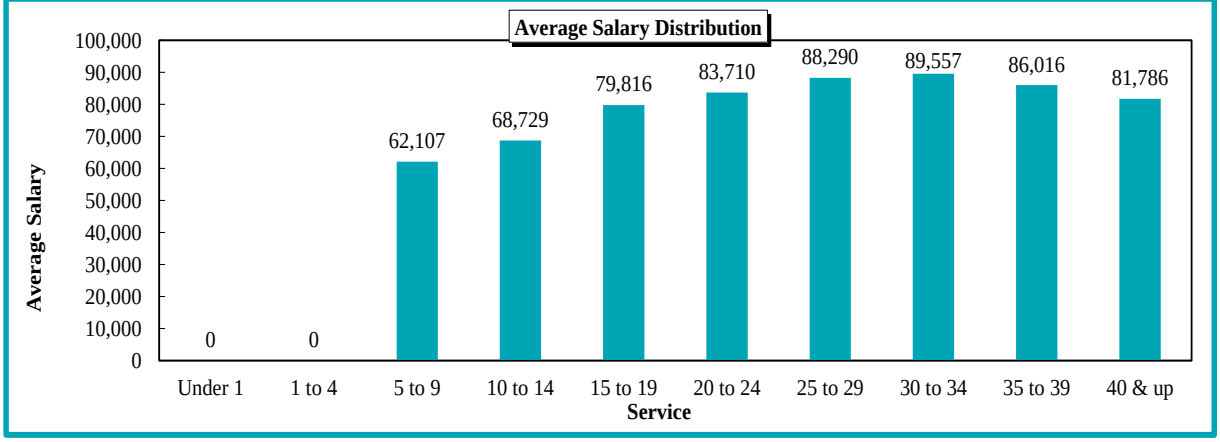
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2021
TIER 1
AVERAGE SALARY BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	0	0	0	0	0	0	0	0	0	0	0
25 to 29	0	0	0	0	0	0	0	0	0	0	0
30 to 34	0	0	60,423	65,574	0	0	0	0	0	0	62,525
35 to 39	0	0	61,639	68,507	80,554	0	0	0	0	0	69,437
40 to 44	0	0	71,875	70,651	80,191	83,539	0	0	0	0	78,357
45 to 49	0	0	77,556	73,104	79,491	83,579	90,132	0	0	0	82,678
50 to 54	0	0	0	0	78,690	85,859	88,444	85,196	0	0	85,159
55 to 59	0	0	0	0	77,048	79,267	85,846	92,212	0	0	86,526
60 to 64	0	0	0	0	0	77,556	86,016	90,161	86,016	81,786	86,961
65 to 69	0	0	0	0	0	0	0	0	0	81,786	81,786
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	0	0	62,107	68,729	79,816	83,710	88,290	89,557	86,016	81,786	78,662

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2021
TIER 1



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2021
TIER 1

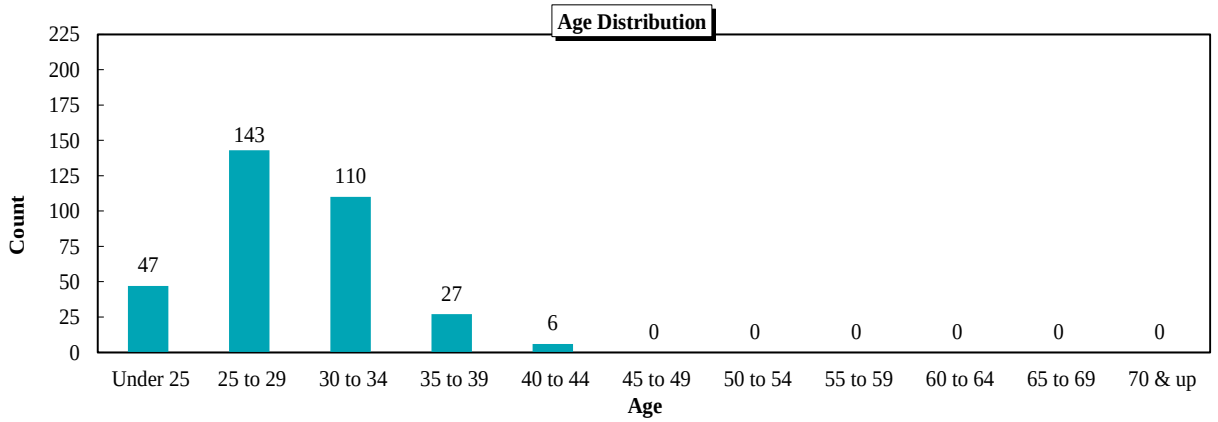


APPENDIX A – MEMBERSHIP INFORMATION

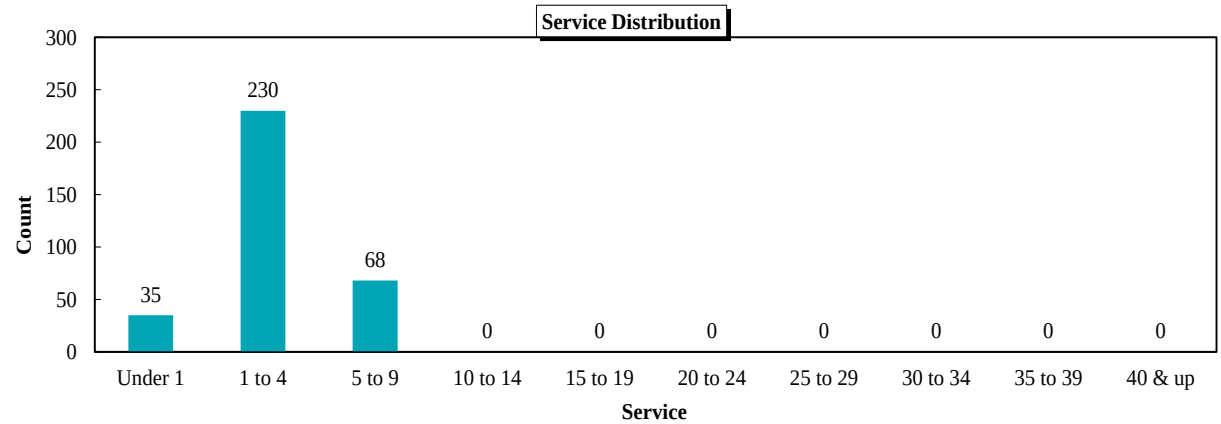
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2021
TIER 2
COUNTS BY AGE/SERVICE

Age	Service: Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & up	Total
Under 25	18	29	0	0	0	0	0	0	0	0	47
25 to 29	13	105	25	0	0	0	0	0	0	0	143
30 to 34	4	80	26	0	0	0	0	0	0	0	110
35 to 39	0	12	15	0	0	0	0	0	0	0	27
40 to 44	0	4	2	0	0	0	0	0	0	0	6
45 to 49	0	0	0	0	0	0	0	0	0	0	0
50 to 54	0	0	0	0	0	0	0	0	0	0	0
55 to 59	0	0	0	0	0	0	0	0	0	0	0
60 to 64	0	0	0	0	0	0	0	0	0	0	0
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	35	230	68	0	0	0	0	0	0	0	333

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2021
TIER 2



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2021
TIER 2

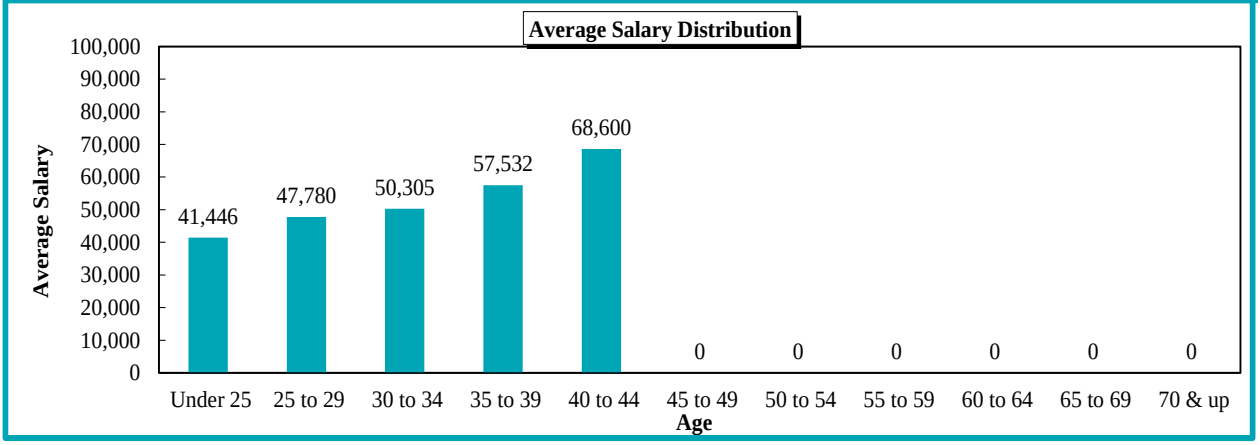


APPENDIX A – MEMBERSHIP INFORMATION

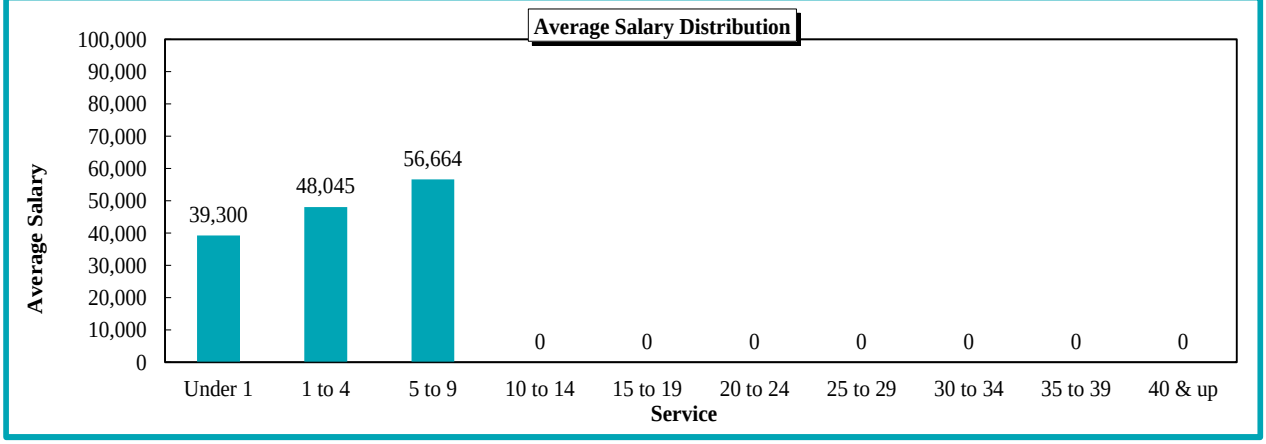
Kansas City Firefighters' Pension Plan Distribution of Active Members by Age and Service as of May 1, 2021
TIER 2
AVERAGE SALARY BY AGE/SERVICE

	Service										
Age	**Under 1**	**1 to 4**	**5 to 9**	**10 to 14**	**15 to 19**	**20 to 24**	**25 to 29**	**30 to 34**	**35 to 39**	**40 & up**	**Total**
Under 25	38,541	43,249	0	0	0	0	0	0	0	0	41,446
25 to 29	38,542	47,205	54,997	0	0	0	0	0	0	0	47,780
30 to 34	45,183	48,635	56,230	0	0	0	0	0	0	0	50,305
35 to 39	0	56,018	58,743	0	0	0	0	0	0	0	57,532
40 to 44	0	69,129	67,542	0	0	0	0	0	0	0	68,600
45 to 49	0	0	0	0	0	0	0	0	0	0	0
50 to 54	0	0	0	0	0	0	0	0	0	0	0
55 to 59	0	0	0	0	0	0	0	0	0	0	0
60 to 64	0	0	0	0	0	0	0	0	0	0	0
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	39,300	48,045	56,664	0	0	0	0	0	0	0	48,886

Kansas City Firefighters' Pension Plan Distribution of Active Members by Age as of May 1, 2021
TIER 2



Kansas City Firefighters' Pension Plan Distribution of Active Members by Service as of May 1, 2021
TIER 2



APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension System
Pensions in Payment Status by Type and Monthly Amount
as of May 1, 2021

Monthly Amount	Total	Voluntary	Vested	Disability	Widows & Children	QDROs
Total	**939**	**553**	**20**	**118**	**223**	**25**
Under $500	22	0	2	0	12	8
$500-1,000	52	1	3	2	38	8
1,000-1,500	51	1	0	3	44	3
1,500-2,000	63	7	1	11	41	3
2,000-2,500	50	8	4	4	33	1
2,500-3,000	49	24	5	2	18	0
3,000-3,500	54	37	1	4	12	0
3,500-4,000	89	77	1	3	6	2
4,000-4,500	201	121	2	71	7	0
4,500-5,000	111	94	0	15	2	0
5,000-5,550	59	53	0	2	4	0
5,500-6,000	62	58	0	0	4	0
6,000-6,500	33	29	1	1	2	0
6,500-7,000	6	6	0	0	0	0
7,000 & over	37	37	0	0	0	0

During the year ended April 30, 2021 there were 47 new pensions awarded (21 Voluntary, 2 Vested, 5 Disabled, and 19 Widows, QDROs, and Children)

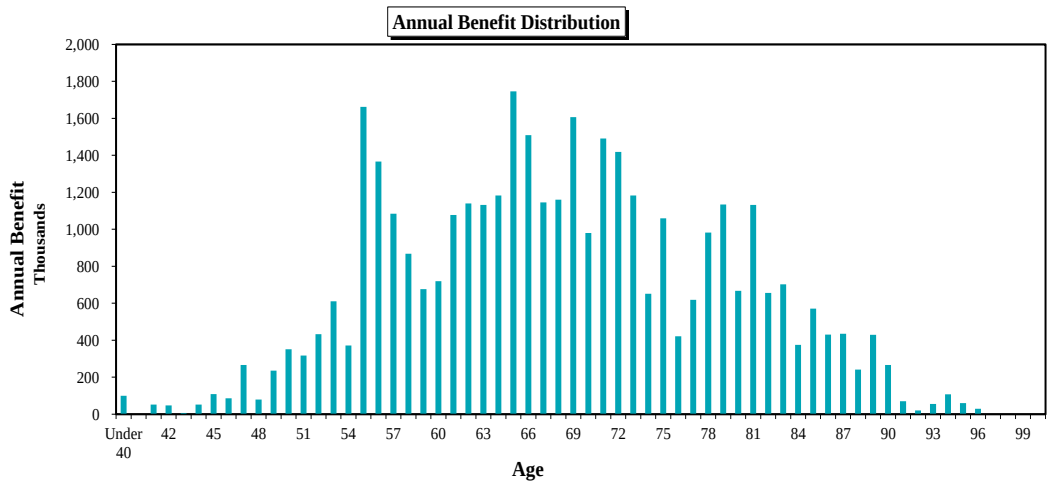
APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension Plan Distribution of Retired Members and Survivors as of May 1, 2021

Age	Count	Annual Benefit	Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	12	$56,805	57	20	$1,084,363	89	20	$428,777
25	0	0	58	17	867,349	90	10	265,374
26	0	0	59	11	675,645	91	3	69,608
27	0	0	60	15	718,597	92	3	19,804
28	0	0	61	21	1,077,324	93	5	54,959
29	0	0	62	20	1,139,637	94	7	106,718
30	0	0	63	23	1,131,395	95	4	59,812
31	0	0	64	19	1,182,629	96	2	29,046
32	0	0	65	30	1,745,442	97	0	0
33	0	0	66	26	1,508,541	98	0	0
34	0	0	67	20	1,145,111	99	0	0
35	0	0	68	21	1,160,131	100	0	0
36	0	0	69	25	1,605,901	101	0	0
37	0	0	70	18	979,930	102	0	0
38	1	18,573	71	30	1,490,847	103	0	0
39	1	23,561	72	26	1,418,113	104	0	0
40	0	0	73	21	1,182,849	105	0	0
41	1	52,092	74	16	651,137	106	0	0
42	2	46,927	75	24	1,059,363	107	0	0
43	1	6,169	76	10	421,177	108	0	0
44	1	52,092	77	16	618,532	109	0	0
45	2	107,976	78	25	981,548	110	0	0
46	2	85,522	79	28	1,133,677	111	0	0
47	5	265,700	80	19	667,077	112	0	0
48	2	78,685	81	26	1,131,055	113	0	0
49	3	234,813	82	17	655,923	114	0	0
50	12	350,786	83	21	702,158	115	0	0
51	6	317,136	84	16	374,185	116	0	0
52	10	432,560	85	17	570,914	117	0	0
53	10	610,304	86	14	430,350	118	0	0
54	8	370,923	87	15	434,150	119	0	0
55	27	1,661,493	88	11	241,163	120	0	0
56	23	1,366,200						
						Totals	821	$37,358,628

The above counts include 322 persons who elected disability retirement after becoming eligible for voluntary retirement.

Kansas City Firefighters' Pension Plan Distribution of Retired Members and Survivors as of May 1, 2021



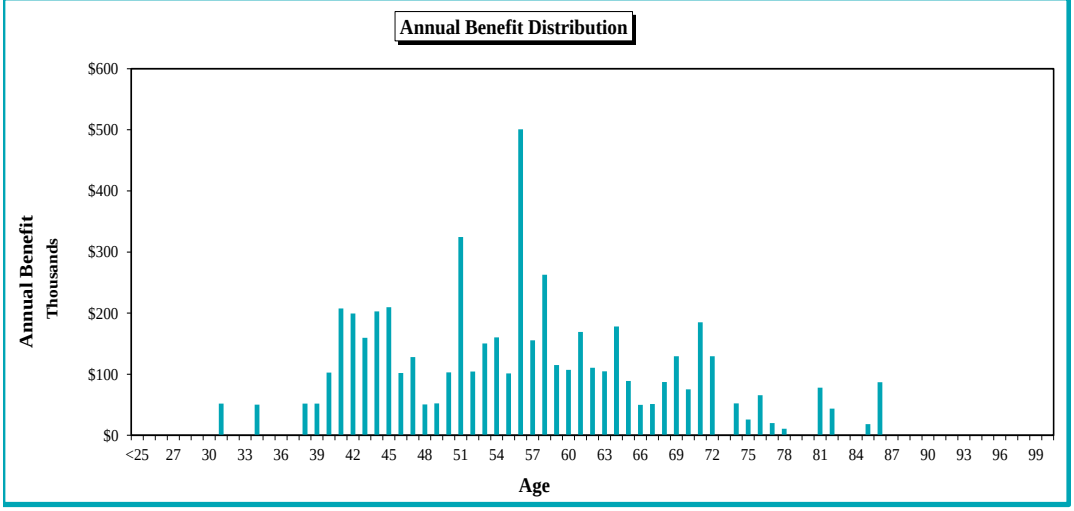
APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension Plan Distribution of Disabled Members as of May 1, 2021

Age	Count	Annual Benefit	Age	Count	Annual Benefit	Age	Count	Annual Benefit
<25	0	$0	57	3	$155,582	89	0	$0
25	0	0	58	5	262,733	90	0	0
26	0	0	59	2	115,143	91	0	0
27	0	0	60	2	107,097	92	0	0
28	0	0	61	3	169,250	93	0	0
29	0	0	62	2	110,666	94	0	0
30	0	0	63	2	104,739	95	0	0
31	1	51,797	64	5	177,955	96	0	0
32	0	0	65	2	89,120	97	0	0
33	0	0	66	1	49,953	98	0	0
34	1	50,371	67	1	51,381	99	0	0
35	0	0	68	2	87,104	100	0	0
36	0	0	69	3	129,278	101	0	0
37	0	0	70	2	75,360	102	0	0
38	1	51,797	71	5	184,942	103	0	0
39	1	51,785	72	3	129,350	104	0	0
40	2	102,569	73	0	0	105	0	0
41	4	207,771	74	1	52,275	106	0	0
42	4	199,473	75	1	25,899	107	0	0
43	3	159,509	76	2	65,689	108	0	0
44	4	202,831	77	1	19,912	109	0	0
45	4	209,703	78	1	10,727	110	0	0
46	2	101,892	79	0	0	111	0	0
47	3	127,969	80	0	0	112	0	0
48	1	50,568	81	3	77,822	113	0	0
49	1	52,198	82	2	43,728	114	0	0
50	2	102,991	83	0	0	115	0	0
51	6	324,644	84	0	0	116	0	0
52	2	104,366	85	1	18,166	117	0	0
53	3	150,333	86	4	86,877	118	0	0
54	3	160,368	87	0	0	119	0	0
55	2	101,468	88	0	0	120	0	0
56	9	500,904						
						Totals	118	$5,466,055

The above counts exclude 322 persons who elected disability retirement after becoming eligible for voluntary retirement.

Kansas City Firefighters' Pension Plan Distribution of Disabled Members as of May 1, 2021



APPENDIX A – MEMBERSHIP INFORMATION

Kansas City Firefighters' Pension System
Change in Plan Membership

Tier 1

	Actives	Vested Terminations	Refund Due	Disabilities	Retirees	Beneficiaries*	Total
May 1, 2020	**715**	**12**	**0**	**116**	**569**	**241**	**1,653**
New Entrants	0	0	0	0	0	0	0
Rehires	0	0	0	0	0	0	0
Vested Terminations	(1)	1	0	0	0	0	0
Terminated with Refund Due	(3)	0	4	0	0	0	1
Return of Contributions	(5)	0	0	0	0	0	(5)
Disabilities	(2)	0	0	2	0	0	0
Retirements	(23)	(2)	0	0	25	0	0
Deaths	(2)	0	0	(2)	(21)	(11)	(36)
New Survivor	0	0	0	0	0	19	19
Benefit Ceased	0	0	0	0	0	(1)	(1)
Miscellaneous Adjustments	4	0	0	1	0	0	5
May 1, 2021	**683**	**11**	**4**	**117**	**573**	**248**	**1,636**

Tier 2

	Actives	Vested Terminations	Refund Due	Disabilities	Retirees	Beneficiaries*	Total
May 1, 2020	**296**	**0**	**13**	**2**	**0**	**0**	**311**
New Entrants	51	0	4	0	0	0	55
Rehires	0	0	0	0	0	0	0
Vested Terminations	0	0	0	0	0	0	0
Terminated with Refund Due	(6)	0	5	0	0	0	(1)
Return of Contributions	(4)	0	(1)	0	0	0	(5)
Disabilities	0	0	0	0	0	0	0
Retirements	0	0	0	0	0	0	0
Deaths	0	0	0	0	0	0	0
New Survivor	0	0	0	0	0	0	0
Benefit Ceased	0	0	0	0	0	0	0
Miscellaneous Adjustments	(4)	0	0	(1)	0	0	(5)
May 1, 2021	**333**	**0**	**21**	**1**	**0**	**0**	**355**

Total

	Actives	Vested Terminations	Refund Due	Disabilities	Retirees	Beneficiaries*	Total
May 1, 2020	**1,011**	**12**	**13**	**118**	**569**	**241**	**1,964**
New Entrants	51	0	4	0	0	0	55
Rehires	0	0	0	0	0	0	0
Vested Terminations	(1)	1	0	0	0	0	0
Terminated with Refund Due	(9)	0	9	0	0	0	0
Return of Contributions	(9)	0	(1)	0	0	0	(10)
Disabilities	(2)	0	0	2	0	0	0
Retirements	(23)	(2)	0	0	25	0	0
Deaths	(2)	0	0	(2)	(21)	(11)	(36)
New Survivor	0	0	0	0	0	19	19
Benefit Ceased	0	0	0	0	0	(1)	(1)
Miscellaneous Adjustments	0	0	0	0	0	0	0
May 1, 2021	**1,016**	**11**	**25**	**118**	**573**	**248**	**1,991**

**Widows, QDROs, and Children*

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. Net Investment Return

7.25% net of investment fees, including inflation at 2.50%

2. Mortality Rates

Non-annuitant mortality: RP-2000 Combined Healthy Non-Annuitant Mortality Table projected using a modified Scale MP-2015 on a generational basis.

Healthy annuitant mortality: RP-2000 Combined Healthy Annuitant Mortality Table set forward one year for males and females, projected using a modified Scale MP-2015 on a generational basis.

Disabled annuitant mortality: RP-2000 Combined Disabled Mortality Table projected using a modified Scale MP-2015 on a generational basis.

Modified Projection Scale: Modified Scale MP-2015 using the Society of Actuaries' model implementation tool with rates converging to the ultimate rate in 2019 (instead of 2029) and an ultimate rate improvement of 0.85% (instead of 1.0%) up to age 85 decreasing to 0.7% (instead of 0.85%) at age 95.

3. Percentage of Deaths that are Duty Related

5.00%

4. Disability Rates

Disability Rates before Retirement	
Age	Disability*
20 - 29	0.01%
30 – 34	0.15%
35 – 39	0.30%
40 – 44	0.50%
45 – 49	1.00%
50 – 64	0.50%
65 and up	---

** Disability rates are set to zero once 25 years of service is earned for Tier 1 members and 27 years of service is earned for Tier 2.*

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

5. Percentage of Disability Retirements that are Duty Related

Disability Retirement Rates (Duty Related)	
Age	Annual Rate
20 - 29	95.0%
30 – 34	90.0%
35 – 44	85.0%
45 and up	80.0%

6. Termination Rates

Termination Rates before Retirement		
	Termination*	
Service	Tier 1	Tier 2
0	3.00%	3.00%
1	2.75%	2.75%
2	2.45%	2.45%
3	2.15%	2.15%
4	1.85%	1.85%
5	1.55%	1.55%
6	1.40%	1.40%
7	1.32%	1.32%
8	1.24%	1.24%
9	1.16%	1.16%
10	1.08%	1.08%
11	1.00%	1.00%
12	0.92%	0.92%
13	0.84%	0.84%
14 – 24	0.75%	0.75%
25 – 26	---	0.75%
27 and up	---	---

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

7. Retirement Rates for Active Employees

Rates of Active Employees		
Years of Service	Rate (%)	
	Tier 1	Tier 2
25	10.00%	---
26	10.00	---
27	10.00	10.00%
28	10.00	10.00
29	20.00	20.00
30	27.50	27.50
31	35.00	35.00
32	35.00	35.00
33	35.00	35.00
34	35.00	35.00
35 years, or age 65 if earlier	100.00	100.00

8. Retirement Age for Inactive Vested Members

50

9. Unknown Data for Members

Same as those exhibited by members with similar known characteristics

10. Percent Married

80% of active male participants and 50% for active female participants

11. Age of Spouse

Males three-years older than females

12. Eligible Children

None

13. Administrative Expenses

0.45% of payroll is added to the normal cost of the system for expected administrative expenses.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

14. Salary Increase

Total Wage Growth: 3.00%, including inflation at 2.50%. Total assumed salary increases including step and promotional increases are based upon years of service and shown in the table below.

Service	Rate
0	8.00%
1	7.70%
2	7.40%
3	7.10%
4	6.80%
5	6.50%
6	6.20%
7	5.90%
8	5.60%
9	5.30%
10	5.00%
11	4.85%
12	4.70%
13	4.55%
14	4.40%
15	4.25%
16	4.10%
17	3.95%
18	3.80%
19	3.65%
20 to 24	3.50%
25 and up	3.00%

15. Cost-of-Living Adjustments for Tier 2 Members

For purposes of valuing future Cost-of-Living Adjustments for Tier 2 members, it is assumed that the percentage increase in the Consumer Price Index will equal or exceed 2.5% and that the funded ratio will equal or exceed 80% at the time that such adjustments would be applied.

16. Interest on Employee Contributions

3.00% per year, compounded annually

17. Change in Assumptions

None

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

B. Rationale for Assumptions

1. Economic Assumptions

The investment return assumption of 7.25% was selected based upon an analysis that included (a) capital market assumptions provided by the investment consultant, (b) the asset allocation of the fund, and (c) investment return assumptions of other public retirement systems.

The inflation assumption of 2.5% was selected based upon an analysis that included (a) input from the investment consultant, (b) historical inflation as measured by the Consumer Price Index, and (c) implied inflation in long-term government bonds.

The long-term wage growth assumption of 3.0% was based upon the inflation assumption of 2.5% plus a real wage growth assumption of 0.5% that was derived from an analysis of historical increases in Social Security Average earnings.

2. Demographic Assumptions

The demographic assumptions are based upon the most recent experience study covering the period 2011-2016.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

C. Disclosures regarding Models Used

In accordance with Actuarial Standard of Practice No. 56 (Modeling), the following disclosures are made:

a. Valuation Software

Cheiron utilizes ProVal, an actuarial valuation software program leased from Winklevoss Technologies (WinTech), to calculate 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 have not identified any material inconsistencies in assumptions or output of ProVal that would affect this actuarial valuation.

b. Projections

This report includes projections of future contributions, assets, and funded status for the purpose of assisting the Board of Trustees with the management of the Fund. We have used Cheiron's R-Scan model to develop these projections. The model is also used to stress test the impact of volatile asset returns over the projection period.

Experience in the model may be varied to illustrate the sensitivity of potential experience compared to a particular assumption. Because the model does not automatically capture how changes in one variable affect all other variables, some scenarios may not be consistent.

The R-Scan projection uses projected benefit payments for current members but does not include projected benefit payments for new members. This limitation is not material for the next 20 years, but longer projection periods should be viewed with caution.

The R-Scan projection uses standard roll-forward techniques that implicitly assume a stable active population. Changes in the demographic characteristics of the active population will lead to different results.

The stochastic projections of investment returns are based on an assumption that each future year's investment return is independent from all other years and is identically distributed according to a lognormal distribution. This assumption may result in an unrealistically wide range of compound investment returns over longer periods of time.

The standard deviation used in the stochastic projection of investment returns was provided by the investment consultant.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

D. Actuarial Methods

1. Funding Method

Entry Age Normal Actuarial Cost Method: Entry age is the age at the time the participant commenced employment. Normal cost and actuarial liability are calculated on an individual basis and are allocated by salary, with normal cost determined as if the current benefit accrual rate had always been in effect.

2. Actuarial Value of Assets

A preliminary actuarial value of assets is calculated as the sum of the beginning of the year actuarial value of assets, the net new money, and the expected return on an actuarial basis. The gains and losses over the last four years are recognized over the next five-year period. The gain or loss of each year is the excess of market value of assets over the preliminary value of assets, minus the sum of the unrecognized gains and losses from each of the four years. Finally, an adjustment is made so that the final actuarial value of assets is at least 80% but no more than 120% of the market value.

3. Amortization of Unfunded Actuarial Liability/(Surplus)

i. Board Funding Policy: 30-year layered amortization method – level percent of pay. Under the layered approach, the May 1, 2008 unfunded actuarial liability is written down over a 30-year period and all future changes to the unfunded actuarial liability establish new 30-year amortization periods. Payroll is expected to increase 3.0% per year.

ii. City Contribution Policy: Under the Ordinance, the City's contribution will be based on a closed 30-year amortization period from May 1, 2014, level percent of pay. Payroll is expected to increase 3.0% per year.

iii. Contribution rate changes as a result of revised assumptions adopted as of May 1, 2017 are phased-in over five years.

4. Changes in Methods

None

APPENDIX C – SUMMARY OF PLAN PROVISIONS

1. Plan Year

May 1 through April 30.

2. Membership

Tier 1: All Firefighters hired prior to April 20, 2014 become members as a condition of employment.

Tier 2: All Firefighters hired on or after April 20, 2014 become members as a condition of employment.

Membership begins on the first day of employment.

3. Creditable Service

Total creditable service is defined as the sum of the service as a Firefighter after becoming a member after July 1, 1953, plus any service earned prior to July 1, 1953, if continuous.

4. Contributions

Pension System:	Members contributed 9.55% of base salary prior to April 20, 2014. Effective April 20, 2014, the member contribution rate increased to 10.55%. For the year beginning May 1, 2020, the City is contributing 35.14% of payroll, which is the actuarially determined Board contribution rate for the prior year. Future City contributions will be determined through the City's budgeting process.
Interest on Employee Contributions:	Determined by the Board of Trustees, not to exceed 3.00%, compounded annually.
Health Insurance Subsidy:	Effective January 1, 2001, the City contribution is 2% of base salary and the employee contribution is 1% of the base salary. Contributions and benefits for the Health Insurance Subsidy are separately accounted for under the Plan. The assets, liabilities, contributions, and benefits of the Health Insurance Subsidy are excluded from this valuation.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

5. Voluntary Retirement

Eligibility requirements:	Tier 1: 25 years of service. Tier 2: 27 years of service
Amount:	The base pension is 2.5% of average final compensation per year of creditable service to a maximum of 80%. Average final compensation is defined as the average of the two highest years of base compensation in the last 10 years. The minimum retirement benefit is $600 per month.

6. Duty Disability Benefit

Age Requirement:	None
Service Requirement:	None
Amount:	The pension is 62.5% of the average final compensation at disability with a minimum 62.5% of the current maximum salary payable to the rank of a firefighter. The current maximum monthly salary as of May 1, 2020 is $6,463.

7. Non-duty Disability

Age Requirement:	Less than 65
Service Requirement:	10 years of service
Amount:	The pension is 25% of the average final compensation plus 2.5% of average final compensation per year of creditable service in excess of 10 years, not to exceed 80% of average final compensation, with a minimum of $600 per month.

8. Vesting

Age Requirement:	None
Service Requirement:	10 years of service

Amount:	2.5% of average final compensation per year of creditable service, not to exceed 62.5% of average final compensation, payable at age 50. If the employee dies in a deferred status, before age 50, the beneficiary receives a lump-sum equal to member contributions with interest. If such death occurs after age 50, the widow and children receive the same benefits as for pre-retirement non-duty death but reduced by the ratio of the member's service to 25 years if in Tier 1, and 27 years if in Tier 2.

9. Withdrawal (Refund) Benefits

Age Requirement:	None
Service Requirement:	Less than 10 years of creditable service
Amount:	If an employee terminates before becoming eligible for a deferred pension, he or she receives a return of member contributions with interest. This benefit is reduced by a service charge of 10%, 8%, 6%, 4%, or 2% if the employee withdraws with less than one year, two years, three years, four years, or five years of employment respectively.

10. Pre-Retirement Duty Death Benefits

Age Requirement:	None
Service Requirement:	None
Funeral Benefit	A lump-sum payment of $2,000
Surviving Spouse Benefit:	100% of the accrued pension is paid with a minimum of 62.5% of the member's average final compensation. The minimum benefit payable is 62.5% of the maximum salary payable to the rank of a firefighter. The current maximum monthly salary as of May 1, 2020 is $6,463. The surviving spouse's benefit for spouses of active firefighters eligible for a service pension is 100% of the regular pension reduced for the election of optional 100% joint and survivor coverage. The minimum benefit is $275 per month.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Child's Benefit:	If there is no surviving spouse or the spouse dies or remarries, the spouse's benefit is divided equally to the children and paid until age 18 (or 21 if a student). If a surviving spouse exists, $100 per month is paid until age 18 (or age 21 if a student).
Return of Contribution:	A return of accumulated contributions and interest is guaranteed. If there is no surviving spouse or dependent children the accumulated contributions and interest or the unpaid balance thereof shall be paid to the Estate or to a named beneficiary.

11. Pre-Retirement Non-duty Death Benefits

Age Requirement:	None
Service Requirement:	None
Funeral Benefit:	A lump-sum payment of $2,000
Surviving Spouse Benefit:	50% of the accrued pension is paid with a minimum of 25% of the average final compensation payable for the life of the surviving spouse. The surviving spouse's benefit for active firefighters eligible for a voluntary pension is 100% of the regular pension, reduced for the election of optional 100% joint and survivor coverage. The minimum benefit is $275 per month.
Child's Benefit:	If no surviving spouse or the spouse dies, the spouse's benefit is divided equally to the children and paid until age 18 (or 21 if a student). If a surviving spouse exists, $100 per month is paid until age 18 (or 21 if a student).
Return of Contributions:	A return of accumulated contributions and interest is guaranteed. If there is no surviving spouse or dependent children the accumulated contributions and interest or the unpaid balance thereof shall be paid to the Estate or to a named beneficiary.

12. Post-Retirement Death Benefit

Age Requirement:	None
Service Requirement:	None

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Amount:	If married to the same person at retirement and death, pension benefits are paid in the form of a Joint and 50% Survivor annuity or in any other available optional form elected by the member and spouse in an actuarially equivalent amount, not less than 25% of the retiree's final average compensation per month. The minimum benefit is $275. Payments equal to the amount of the member's accumulated contributions and interest are guaranteed. In addition, a lump-sum funeral benefit of $2,000 is paid.

13. Cost-of-Living Adjustment (COLA)

Tier 1: An increase of 3.00% of the original pension will be made annually. This does not apply to funeral benefits.

Tier 2: COLA will only be payable if the prior year's funding ratio is greater than or equal to 80% and will be equal to the percentage increase in the consumer price index, up to a maximum of 2.50%, payable at the 27th anniversary of the date of hire.

Members must retire on or before January 1, in order to receive a COLA in the next year.

14. 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 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 Percentage

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.