Request for Legislative Action

Ord. #5708
Sponsor: Charlie Franklin
Date: January 9, 2023

Completed by County Counselor's Office			
Action Requested:	Ordinance	Res.Ord No.:	5708
Sponsor(s):	Charlie Franklin	Legislature Meeting Date:	1/9/2023

Introduction
Action Items: ['Courtesy']
Project/Title:
An ordinance amending subsection 1503.2 and 1503.3, Jackson County Code, 1984, relating to the Employee's Pension Plan.

Request Summary
The Jackson County Pension Plan Board of Trustees recommends a revision to Ordinance No. 1503.2 and 1503.3. Section 1503.2 amends the definition of "Actuarial Equivalent" as recommended by the Fund Actuary. The definition should be consistent with the assumptions used for purposes of the annual valuation. It also clarifies that a COLA assumption is also used and will be the rate adopted by and used in the most recent actuarial valuation, compounded annually. Section 1503.3 defines "Actuarial Value" as recommended by the Fund Actuary, which is to require that the assumptions for calculating lump sum benefits, if any, be consistent with the assumptions utilized for the purposes of the annual valuation.

Contact Information			
Department:	Human Resources	**Submitted Date:**	12/28/2022
Name:	Michelle K. Chrisman	**Email:**	MChrisman@jacksongov.org
Title:	Director of Human Resources	**Phone:**	816-881-1204

Budget Information			
Amount authorized by this legislation this fiscal year:			$ 0
Amount previously authorized this fiscal year:			$ 0
Total amount authorized after this legislative action:			$
Is it transferring fund?			No
Single Source Funding:			
Fund:	Department:	Line Item Account:	Amount:
			!Unexpected End of Formula

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Prior Legislation	
Prior Ordinances	
Ordinance:	Ordinance date:
4083	February 17, 2009
3515	July 1, 1999
Prior Resolution	
Resolution:	Resolution date:

Purchasing	
Does this RLA include the purchase or lease of supplies, materials, equipment or services?	No
Chapter 10 Justification:	
Core 4 Tax Clearance Completed:	
Certificate of Foreign Corporation Received:	
Have all required attachments been included in this RLA?	

Compliance	
Certificate of Compliance	
Not Applicable	
Minority, Women and Veteran Owned Business Program	
Goals Not Applicable for following reason: Not Spending Money	
MBE: .00%	
WBE: .00%	
VBE: .00%	
Prevailing Wage	
Not Applicable	

Fiscal Information
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Request for Legislative Action

History
Submitted by Human Resources requestor: Michelle K. Chrisman on 12/28/2022. Comments: Submitted per request of Fund Counsel. Approved by Department Approver Gina M. Campbell on 12/28/2022 4:21:32 PM. Comments: Not applicable by Purchasing Office Approver Barbara J. Casamento on 12/29/2022 8:56:31 AM. Comments: Approved by Compliance Office Approver Jaime Guillen on 12/29/2022 9:49:46 AM. Comments: Not applicable by Budget Office Approver David B. Moyer on 12/29/2022 9:57:44 AM. Comments: Approved by Executive Office Approver Sylvya Stevenson on 12/29/2022 10:03:26 AM. Comments: Approved by Counselor's Office Approver Katherine Henry on 1/5/2023 11:02:03 AM. Comments:

CHEIRON Classic Values, Innovative Advice

Jackson County Missouri Revised Pension Plan

Actuarial Valuation Report as of July 1, 2022

Produced by Cheiron
October 2022

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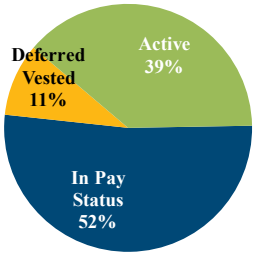
Highlights of this report are summarized in the tables and graphs below.

Contributions

	Fiscal Year Ending 2023	2022
Normal Cost Rate	6.76%	5.78%
Admin Expense Rate	0.45%	0.32%
UAL Rate	3.79%	5.42%
Total ER Rate	**11.00%**	**11.52%**

As a Percent of Pay

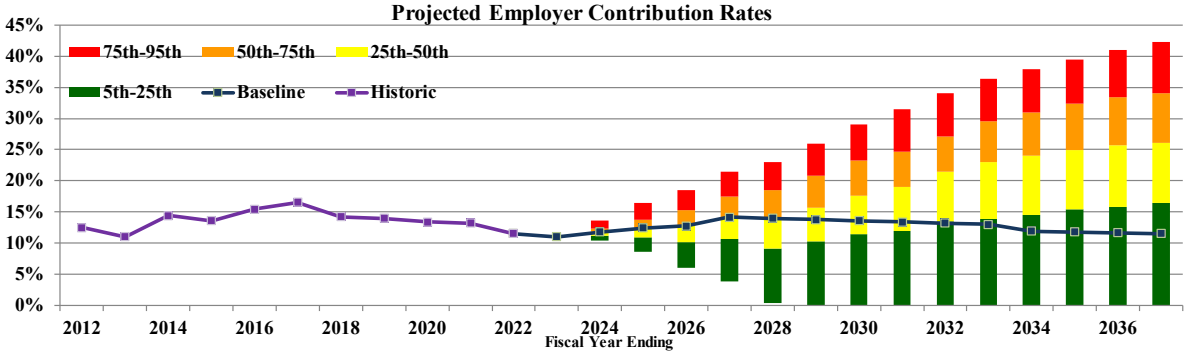
Actuarial Liability

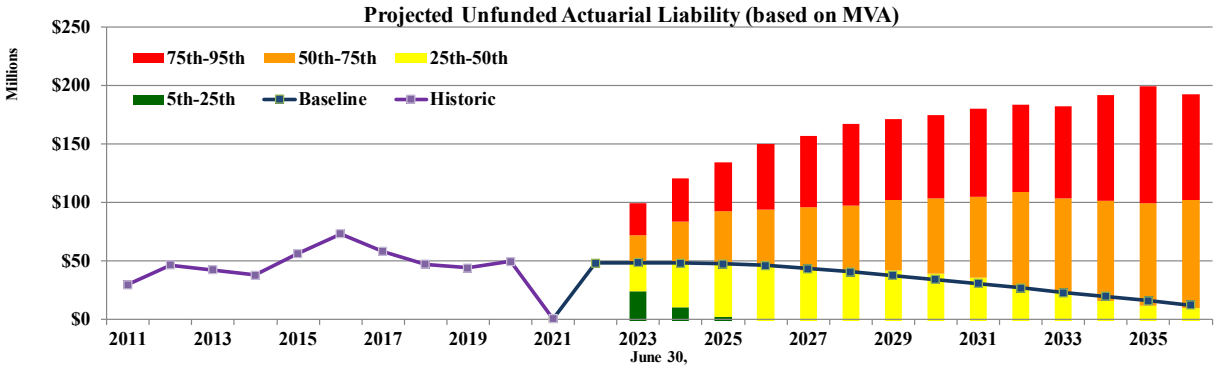


Funding Status

	Valuation Date 7/1/2022	7/1/2021
Actuarial Liability (AL)	$ 376	$ 375
Market Value of Assets (MVA)	$ 328	$ 374
Unfunded AL (UAL) - MVA	**$ 48**	**$ 1**
Funded Ratio - MVA	**87.2%**	**99.8%**
Actuarial Value of Assets (AVA)	$ 355	$ 340
UAL - AVA	**$ 21**	**$ 35**
Funded Ratio - AVA	**94.4%**	**90.6%**

Amounts in Millions





SECTION I – BOARD SUMMARY

Membership

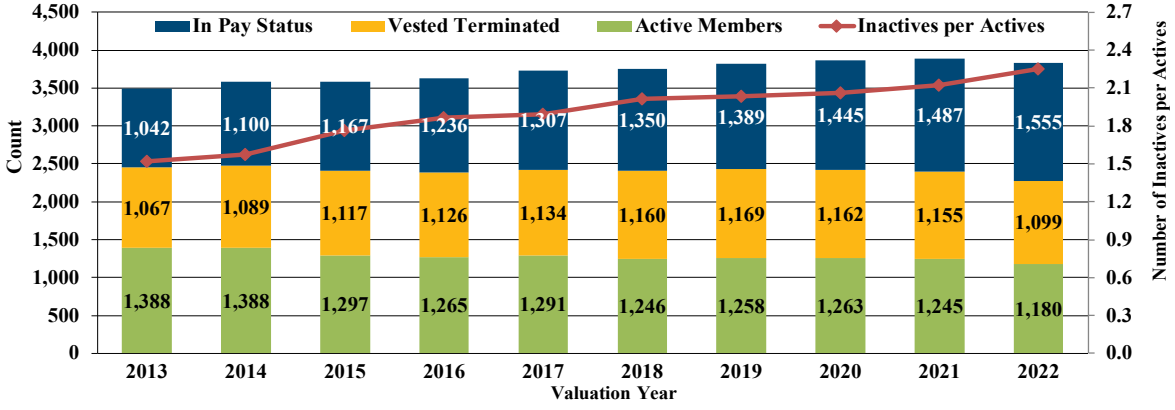
Underlying the changes in the actuarial valuation from one year to the next are changes in the membership of the Plan. These changes affect the liability of the Plan as well as contributions to the Plan. As shown in Table I-1 below, total membership decreased 1.4% from 2021 to 2022. Active membership decreased by 5.2% and total payroll increased by 1.2% and average payroll increased 6.8%. Total payees (retirees, disabled members, and beneficiaries) increased by 4.6% and terminated vested members decreased by 4.8%.

Table I-1
Jackson County, Missouri Revised Pension Plan
Participant Data

	July 1, 2021	July 1, 2022	% Change
Active Participants	1,245	1,180	(5.2%)
Terminated Vested Participants	1,155	1,099	(4.8%)
Participants in Pay Status			
Retirees	1,278	1,337	4.6%
Disabled Members	37	37	0.0%
Beneficiaries	172	181	5.2%
Total	**3,887**	**3,834**	(1.4%)
Active Member Payroll	$ 71,084,998	$ 71,949,487	1.2%
Average Payroll per Active	$ 57,096	$ 60,974	6.8%

As shown in the following chart, the number of active members declined from 1,388 in 2013 to 1,180 in 2022. At the same time, the number of members in pay status has increased from 1,042 in 2013 to 1,555 in 2022, and the number of deferred vested members has increased from 1,067 in 2013 to 1,099 in 2022. As a result, the number of inactive members (payees and deferred vested) supported by each active member has increased from approximately 1.5 in 2013 to 2.2 in 2022 as illustrated by the line that goes with the right axis scale in the table. As there are fewer actives to support each retiree, contributions tend to become more sensitive to gains and losses.

Historical Membership Counts



SECTION I – BOARD SUMMARY

Assets and Liabilities

This report measures assets and liabilities for funding purposes only. There is a separate report for financial reporting. Table I-2 below summarizes the actuarial liability, assets, and related ratios for the Plan as of July 1, 2022, compared to July 1, 2021. The actuarial liability grew 0.2% reflecting the continued accrual of benefits that occurred this year plus an actuarial loss which were mostly offset by changes in actuarial assumptions.

Table I-2
Jackson County, Missouri Revised Pension Plan
Summary of Key Valuation Results

	July 1, 2021	July 1, 2022	% Change
Actuarial Liability (AL)	$ 374,983,233	$ 375,907,555	0.2%
Market Value of Assets (MVA)	$ 374,207,055	$ 327,765,905	(12.4%)
Actuarial Value of Assets (AVA)	$ 339,693,791	$ 354,724,703	4.4%
Unfunded Actuarial Liability (UAL)			
MVA Basis	$ 776,178	$ 48,141,650	6102.4%
AVA Basis	$ 35,289,442	$ 21,182,852	(40.0%)
Funded Ratio (MVA)	99.8%	87.2%	
Funded Ratio (AVA)	90.6%	94.4%	
Active Member Payroll	$ 71,084,998	$ 71,949,487	1.2%
Asset Leverage Ratio	5.3	4.6	(13.2%)
Actuarial Liability Leverage Ratio	5.3	5.2	(1.9%)

The market value of assets is less than the actuarial value. The funded ratio on an AVA basis increased from 90.6% to 94.4% while the funded ratio on a MVA basis decreased from 99.8% to 87.2%. As a result, contribution rates are expected to increase over the next few years.

There was a change in actuarial assumptions since the prior valuation. This change reduced the actuarial liability at July 1, 2022 by $15.4 million. Using the prior actuarial assumptions the funded ratio on an AVA basis would have been 90.6%.

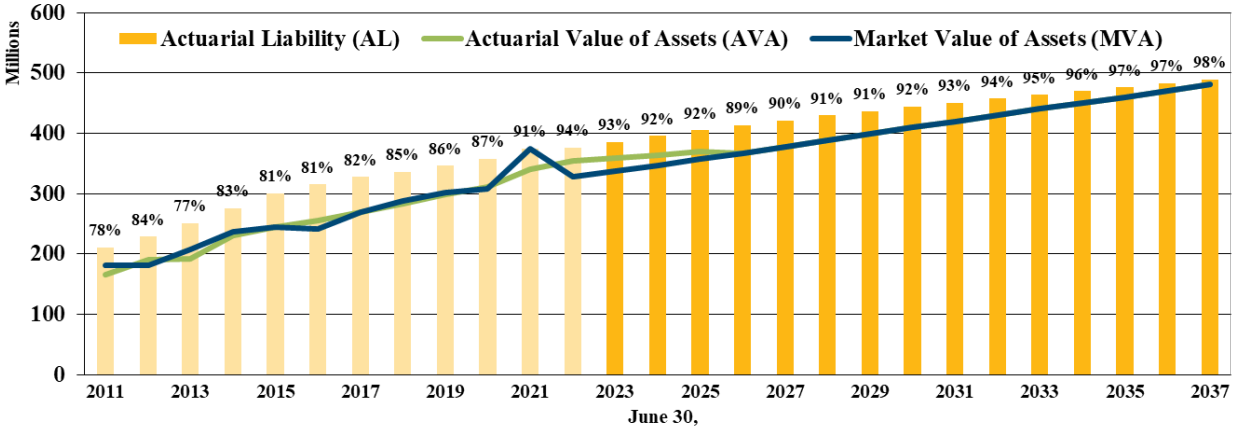
One way to measure the maturity of a pension plan is to look at the leverage ratio of the plan's assets and liabilities compared to the payroll because contributions are tied to payroll. As these leverage ratios increase, gains or losses have a larger impact on the contributions required for the plan. There was a decrease in the asset leverage ratio this year which reflects the decrease in the market value of assets and the increase in payroll. The asset leverage ratio (market value of assets divided by payroll) of 4.6 means that if the plan experiences a 10% loss on assets compared to the discount rate of 6.75%, the loss would be equivalent to 46% of payroll. As the Plan becomes better funded, the asset leverage ratio will increase, and if it was 100% funded, it would equal the actuarial liability leverage ratio of 5.2 (actuarial liability divided by payroll).

SECTION I – BOARD SUMMARY

Despite the tendency to focus on the most recent valuation results, it is important to remember that each valuation is merely a snapshot of the long-term progress of the Plan. The results of the current year's valuation should be evaluated in the context of historical trends, as well as trends expected into the future. The projections in this section are based upon the employers' current contribution policy as described in the Contribution Rate paragraphs on page 5.

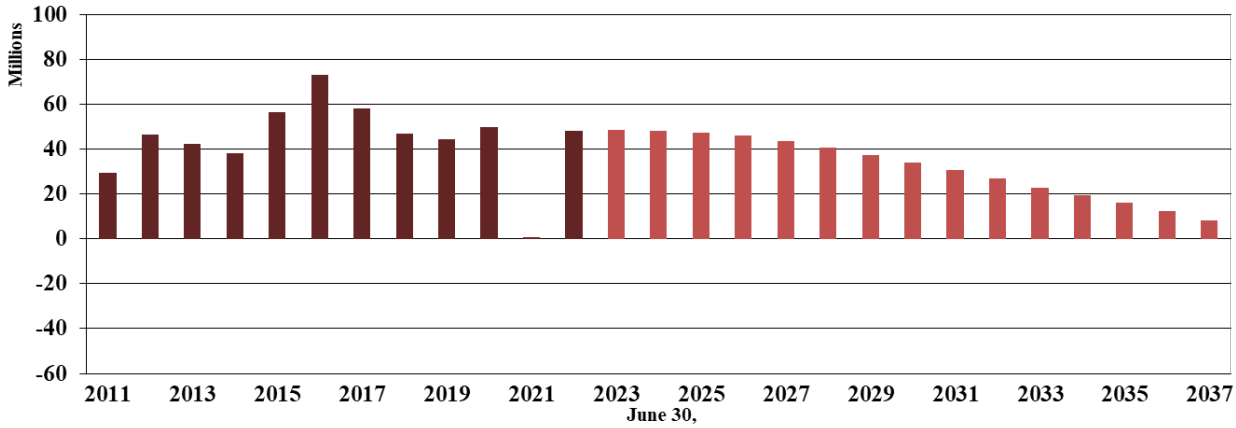
The chart below shows the historical and projected trends for assets (both market and smoothed actuarial) versus the actuarial liability, and also shows the progress of the funded ratios (based on the actuarial value of assets) since 2011. The historical actuarial liability is shown in light gold while the projected actuarial liability is shown in a darker gold. If all assumptions are met in the future including an expected return of 6.75% each year, and the contributions are made as based on the current contribution policy, the funded status is expected to increase to 98% by 2037.

Assets and Actuarial Liability 2011-2037



The chart below shows the historic, current, and projected UAL through 2037. The UAL is expected to decline over this period. The increase from 2021 to 2022 is a result of the large investment losses over the last year. The UAL shown is the difference between the actuarial liability and the market value of assets. The current employer contribution policy results in an expected gradual decline in the UAL over time.

Historic and Deterministic Projected Unfunded Actuarial Liability (MVA Basis)



SECTION I – BOARD SUMMARY

Contribution Rates

The Plan's funding policy sets employer contributions to be the actuarially determined employer contribution rate equal to the sum of:

- The normal cost under the entry age normal actuarial cost method
- The expected administrative expenses for the year
- An amortization of the unfunded actuarial liability as follows:
    - A 20-year closed level dollar amortization of the COLA change recognized at July 1, 2013, and
    - A 20-year layered level dollar amortization of the remaining unfunded actuarial liability beginning with a 20-year amortization of the unamortized UAL as of July 1, 2017.

We understand that the contribution policy of the participating employers is as follows:

- For calendar years prior to 2020, Jackson County, made a contribution based on total budgeted payroll (i.e., not just pension payroll). The contribution was 9% of general employee budgeted payroll and a contribution rate determined annually for other employee payroll which may or may not be equal to the most recent actuarially determined employer contribution rate. For employers other than the County, contributions were made at the actuarially determined rate.
- For calendar years beginning 2020 and later, the County and all other employers contribute the actuarially determined contribution rate determined in the prior year's actuarial valuation. For calendar year 2022 the rate is 11.52% which was the actuarially determined rate from the July 1, 2021 actuarial valuation.

Elected Officials contribute 4.00% of their salary. Plan members other than Elected Officials do not contribute to the Plan.

Table I-3 summarizes the actuarially determined contribution rates for the 2022 and 2023 calendar years. The contribution rate has decreased mostly due to the assumption changes. Under the prior actuarial assumptions, the contribution rate for 2023 would have been 12.10%.

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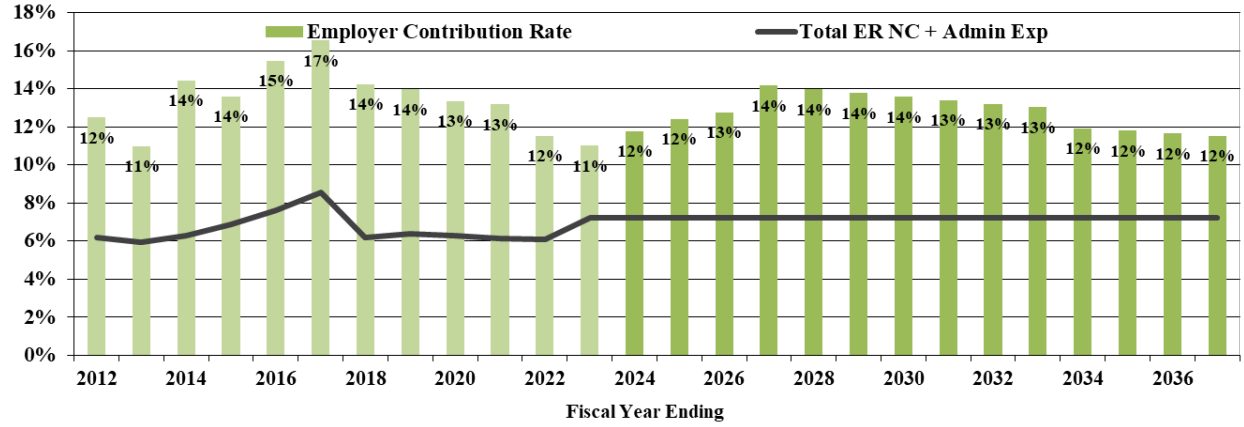
Table I-3
Jackson County, Missouri Revised Pension Plan
Components of Contribution Rate

	July 1, 2021 Calendar Year 2022	July 1, 2022 Calendar Year 2023	% Change
Normal Cost Contribution	5.78%	6.76%	
Administrative Expense Rate	0.32%	0.45%	
Unfunded Actuarial Liability Contribution	5.42%	3.79%	
Total Contribution	11.52%	11.00%	
Actuarially Determined Contribution	$ 8,188,992	$ 7,914,444	(3.4%)

The unfunded actuarial liability is amortized with a 20-year layered amortization method beginning at July 1, 2017, except for a plan change in 2013 which is amortized over a closed 20-year period beginning July 1, 2013. The amortizations are level dollar amounts.

The chart below shows the historic and projected actuarially determined contribution rates. These contribution rates assume that all assumptions are met. The black line shows the historic and projected total normal cost rate. Historic rates and rates calculated through the fiscal year ending June 30, 2022, are shown in a lighter shade than the projected future contribution rates.

Actuarially Determined Contribution Rates FYE 2012-2037



Future actuarially determined contribution rates are expected increase over the next four years as the investment losses of 2022 are recognized, and then gradually decrease over time as the level dollar amortization amounts are expressed as a percentage of an increasing payroll base.

SECTION II – CERTIFICATION

The purpose of this report is to present the July 1, 2022 actuarial valuation of the Jackson County, Missouri Revised Pension Plan ("Plan"). This report is for the use of the Plan and Jackson County.

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

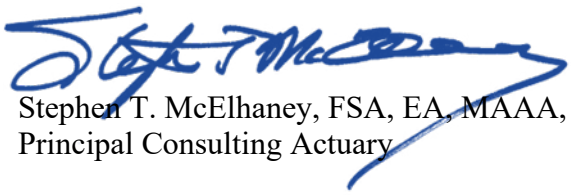
All the assumptions in this report were adopted by the Board and are based on our experience study covering plan experience during the period from July 1, 2016 through June 30, 2021.

The liability measures and funding ratios in this report are for the purpose of establishing contribution rates. These measures are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the Plan's benefit obligations.

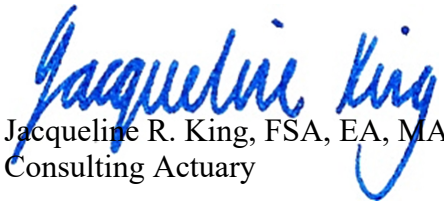
Future actuarial measurements may differ significantly from the current measurements due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; and changes in plan provisions or applicable law.

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 Plan for the purposes described herein. This report is not intended to benefit any third party, and Cheiron assumes no duty or liability to any such party.



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



Jacqueline R. King, FSA, EA, MAAA
Consulting Actuary

SECTION III – DISCLOSURES RELATED TO RISK

Actuarial valuations are based on a set of assumptions about future economic and demographic experience. These assumptions represent a reasonable estimate of future experience, but actual future experience will undoubtedly be different and may be significantly different. This section of the report is intended to identify the primary risks to the Jackson County, Missouri Revised Pension Plan (JCRPP), 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 JCRPP to plans within the Public Plans Database. Information regarding this data can be found at https://publicplansdata.org/.

Identification of Risks

While there are several 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,
- Assumption change risk, and
- Contribution risk.

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

Assessing Costs and Risks

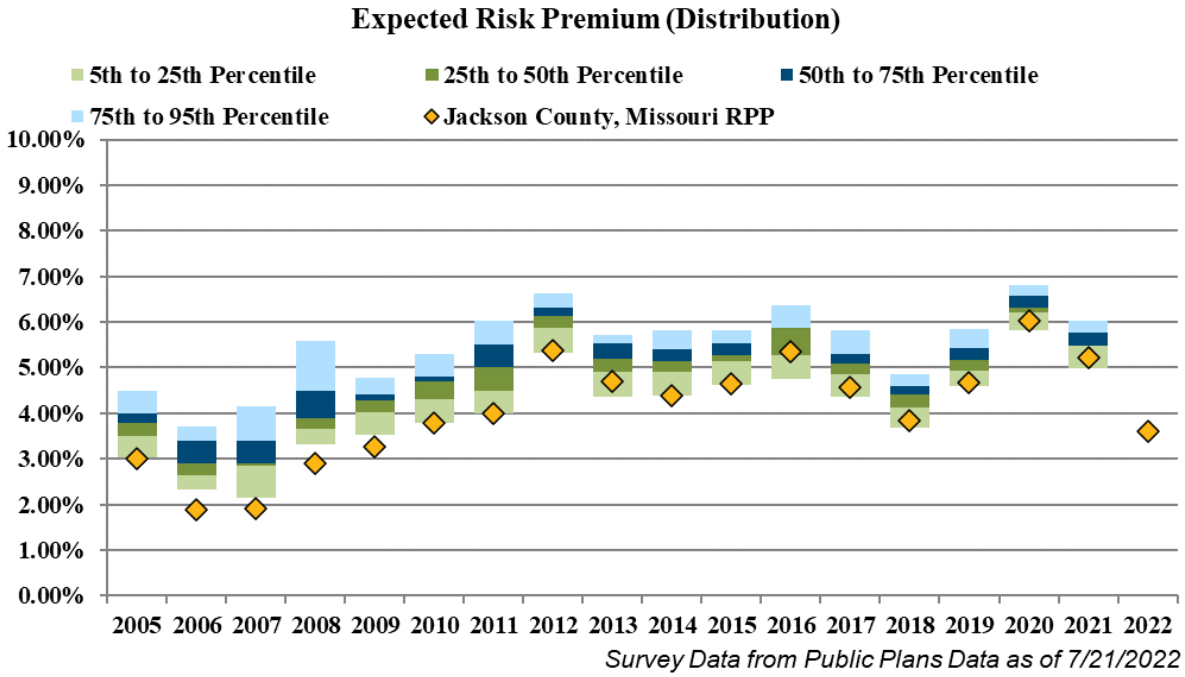
The fundamental risk to JCRPP is that the contributions needed to fund the benefits become unaffordable. Assessing this risk, however, is complex because there is no bright line of what is unaffordable and the contribution amounts themselves are affected not just by the experience of JCRPP, but also 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. If investment returns are lower than anticipated the unfunded actuarial liability will increase necessitating higher contributions in the future unless there are other gains that offset these investment losses. Fully funded plans have additional risk since there is an anticipation of no longer having an unfunded liability, so the potential of an adverse investment year poses a greater risk than it would on an unfunded plan. The potential volatility of future investment returns is determined by JCRPP'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 10 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. One way to assess the impact of this risk is to examine how interest

SECTION III – DISCLOSURES RELATED TO RISK

rates affect a plan's risk premium. The amount of a plan's investment risk can be defined as the risk premium. The risk premium is the excess of the plan's assumed interest rate over a risk-free interest rate. The next chart shows the historical risk premium taken (defined as the excess of a plan's interest rate over a 10-year Treasury security) for approximately 220 public plans included in the Public Plans Database survey. 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 has increased for both JCRPP and the plans in the database even though JCRPP and most other plans have decreased their discount rates. This demonstrates how interest rates can impact the risks of a plan. The risk premium has decreased over the last two years as the yields on Treasury rates have increased. JCRPP has been in the lower quartile of risk premium compared to other plans in the Public Plans Database. This means relative to other plans in the database, JCRPP is taking on less investment risk.

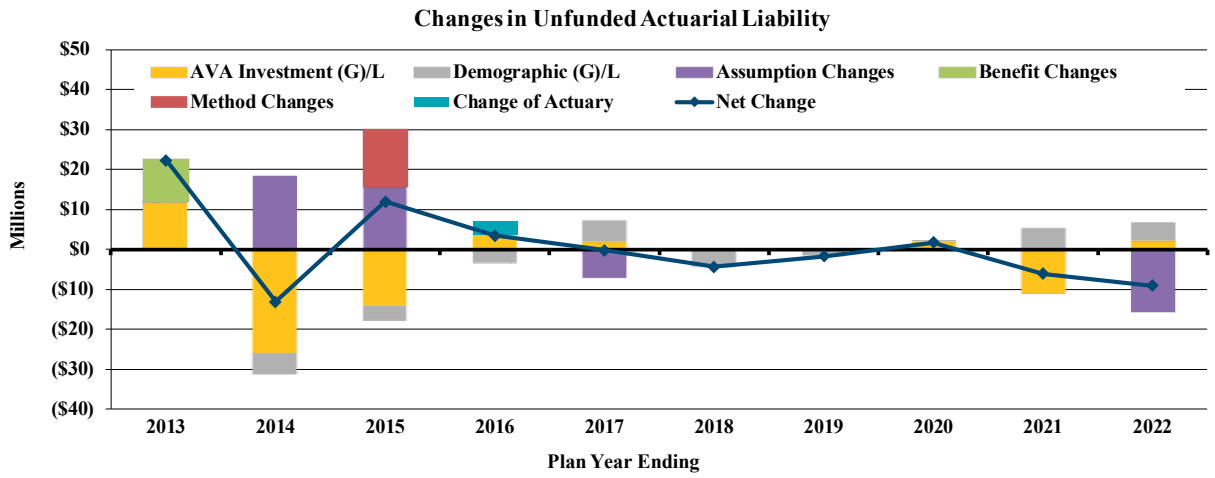


Longevity and other demographic risks are the potentials for mortality or other demographic experience to be different than expected. Generally, longevity and other demographic risks emerge slowly over time and are often dwarfed by other changes, particularly those due to investment returns. The chart on page 10 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 expectations 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 following 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 assumption change increases in the UAL in 2014 and 2015 were primarily due to adopting new mortality tables. Most assumptions were modified in 2017 and again in 2022 to reflect the results of the most recent experience studies. 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.



Contribution risk is the potential of future contributions deviating from expected contributions or that future contributions are not made in accordance with the Plan's funding policy. Since prior to 2020 a large percentage of the County's contribution was based upon a fixed 9% rate, the possibility existed that these contributions would not result in the full actuarially determined contribution being made. However, the current policy of the County is to contribute at the actuarially determined contribution rate.

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. When assessing each of these risks, it is important to understand the maturity of JCRPP compared to other plans and how 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 are important in understanding the primary risks identified for the plan.

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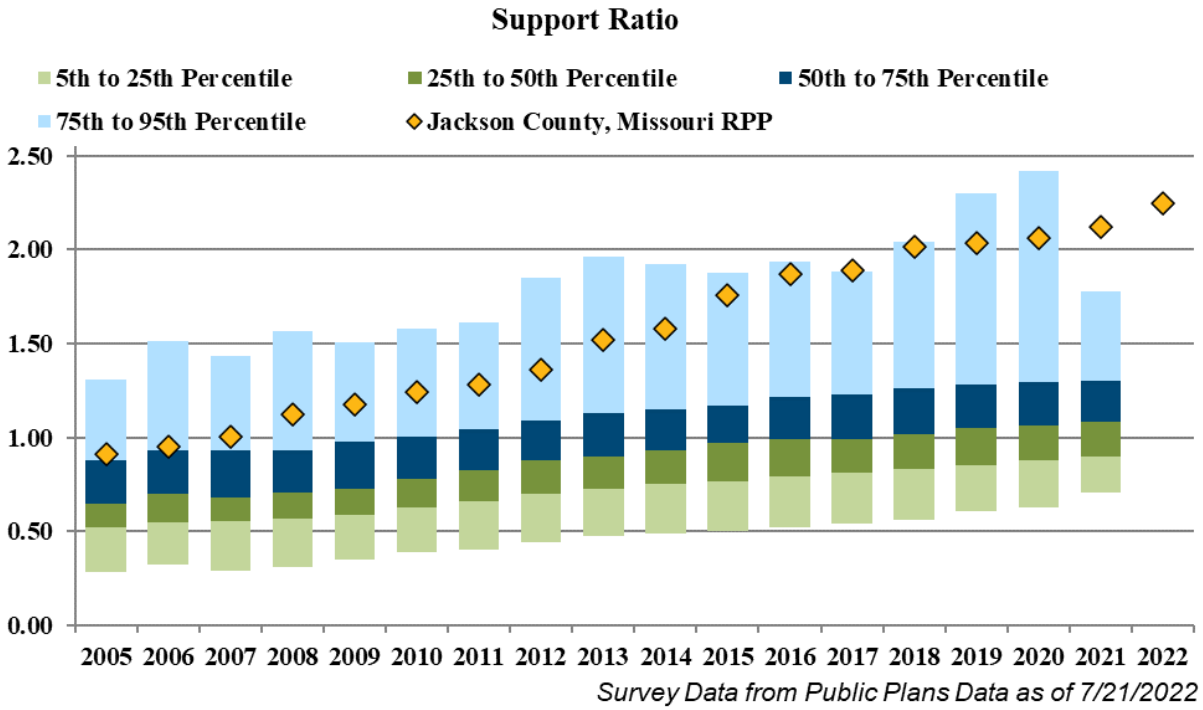
Support Ratio (Inactives per Active)

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 indicates a larger plan relative to its revenue base as well. Details regarding the JCRPP support ratio are shown in the chart on page 2.

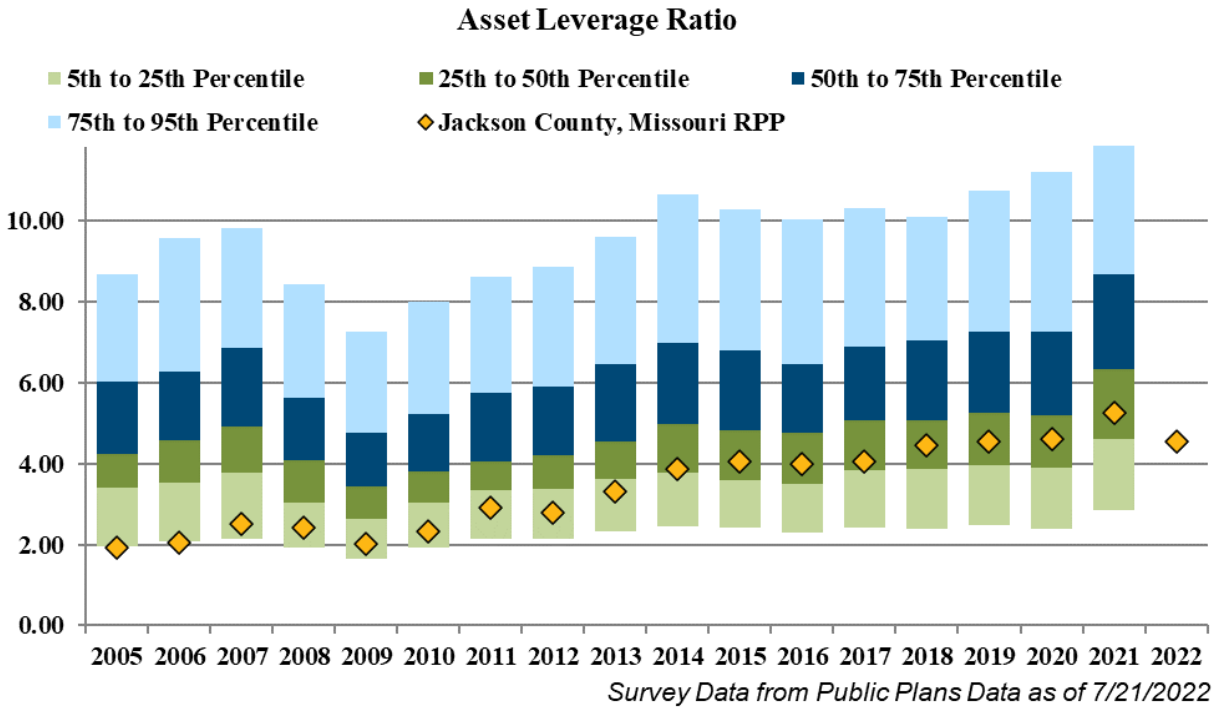


The chart above shows the distribution from the 5th percentile to the 95th percentile of support ratios for the Plans in the Public Plan Database. The gold diamonds show how JCRPP compares to the plans in the Public Plans Database. JCRPP has moved from about the 75th percentile to about the 95th percentile since 2005 compared to other plans in the Public Plans Database. This means relative to other plans in the database JCRPP is relatively more mature and may be more sensitive to risks.

SECTION III – DISCLOSURES RELATED TO RISK

Leverage Ratios

As discussed on page 3, leverage ratios measure the size of the plan compared to its revenue base more directly. An asset leverage ratio of 5, for example, means that if JCRPP experiences a 10% loss on assets compared to the expected return, the loss would be equivalent to 50% of payroll. The same investment loss for a plan with an asset leverage ratio of 10 would be equivalent to 100% of payroll.



The chart above shows the distribution from the 5th percentile to the 95th percentile of the market value of assets (MVA) leverage ratios for the plans in the Public Plan Database. The gold diamonds show that JCRPP has moved from below the 5th percentile to over the 25th percentile since 2005 compared to other plans in the Public Plans Database. This means that although JCRPP has a relatively lower MVA leverage ratio, and thus is less mature on this basis, than most plans in the database it is maturing faster than the overall database. Recall that the support ratio indicated that JCRPP is more mature on that basis than most plans in the database, which shows these risk indicators give insight to the Plan but are not bright-line measures.

The Actuarial Liability (AL) leverage ratio indicates how sensitive JCRPP is to experience gains and losses or assumption changes. For example, an assumption change that increases the AL by 4% would add a liability equivalent to about 20% of payroll if the AL leverage ratio is 5.

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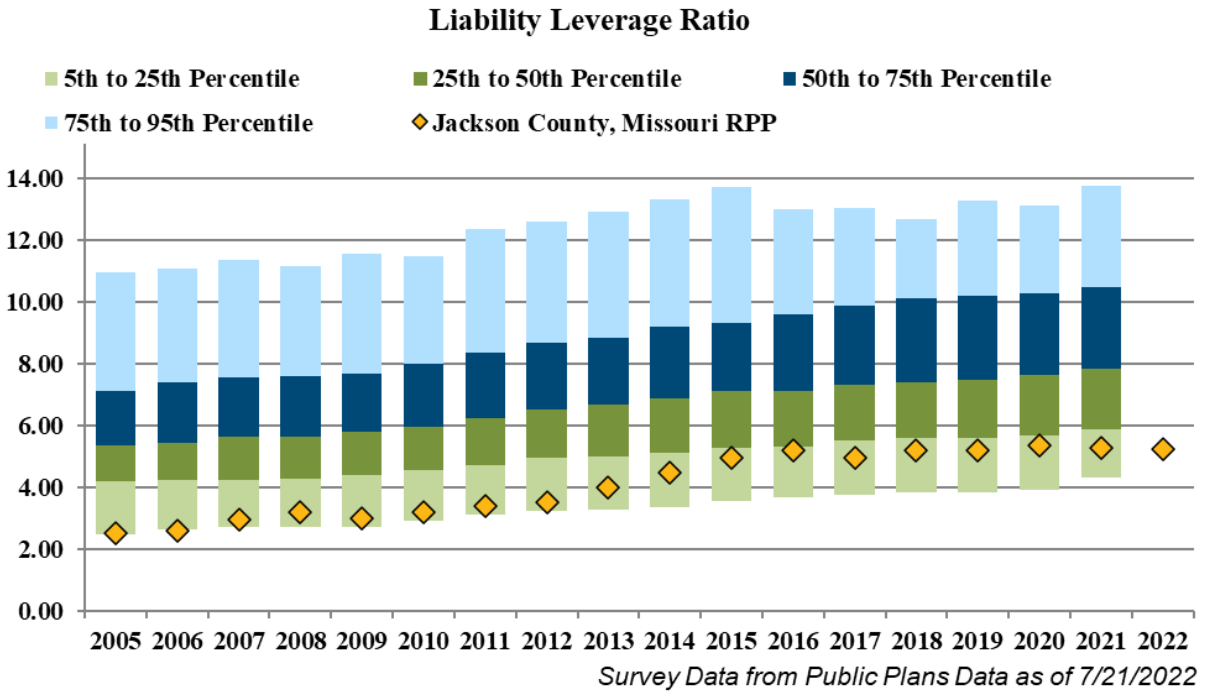
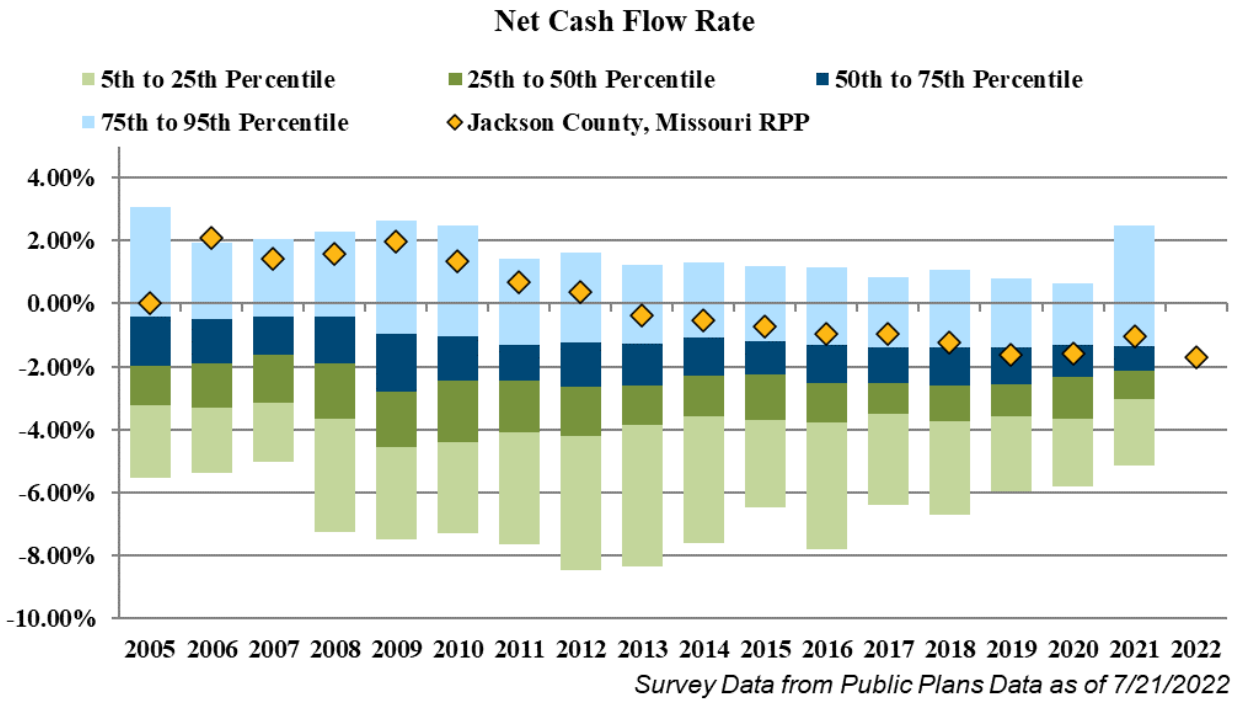


The above charts show the distribution from the 5th percentile to the 95th percentile of the Actuarial Liability leverage ratios for the plans in the Public Plan Database. The gold diamonds show how JCRPP compares to the plans in the Public Plans Database. JCRPP is in the lower quartile of plans in the Public Plans Database. This means relative to other plans in the database JCRPP may be able to better handle risks since it is relatively small in relation to its revenue, which again is different from the conclusion reached from the Support Ratio above.

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.

SECTION III – DISCLOSURES RELATED TO RISK



The chart above again 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 gold diamonds show how JCRPP compares to the plans in the Public Plans Database. The conclusion from this measure is similar to the conclusion for the Leverage Ratios in that JCRPP may be better able than the other plans to handle risks since it does not have as large of negative net cash flow as most of the plans in the database.

Stochastic Projections

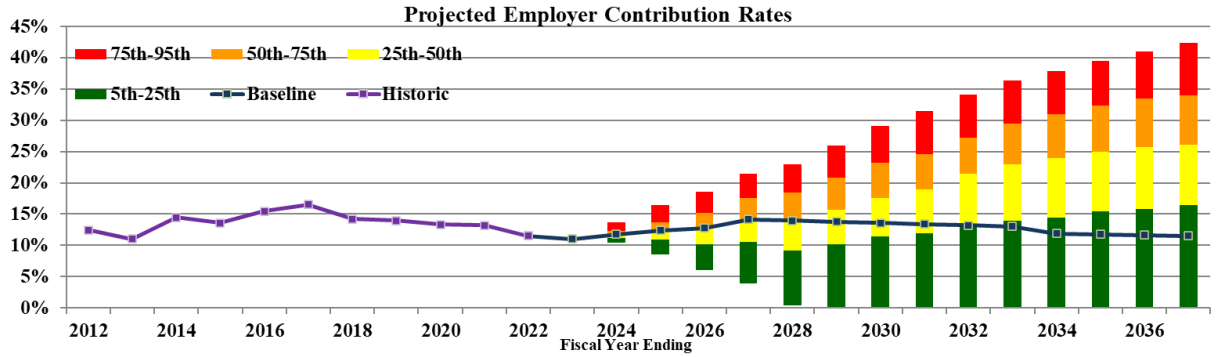
If experience has taught us anything, it is that there is a significant level of uncertainty in projections of the future. The largest source of uncertainty is the projection of investment returns. To better understand the potential impact of investment returns on the Plan, we have included stochastic projections of future actuarially determined contribution rates and unfunded actuarial liability (UAL) in this section of the report. A stochastic projection assumes the investment return can vary randomly around the long term assumed return rate and within one standard deviation of its mean and then produces 1,000 such projections to provide the probability of future outcomes.

The stochastic projections assume a geometric return of 6.75% and a standard deviation of 10.67% (based on ACG's capital market assumptions for JCRPP's target investment portfolio). Each projection contains 1,000 trials that are 15 years in length. The purple line shows the historical values and the black line shows the projected values based on a 6.75% return each and every year. It is also assumed that employers continue the current contribution policy. The colored ranges represent different percentiles of the 1,000 trials.

SECTION III – DISCLOSURES RELATED TO RISK

The following chart shows the historical and projected actuarially determined contribution rates. The overall trend is for lower contribution rates in the future, but the range of potential contribution rates that depend on actual investment returns is large.

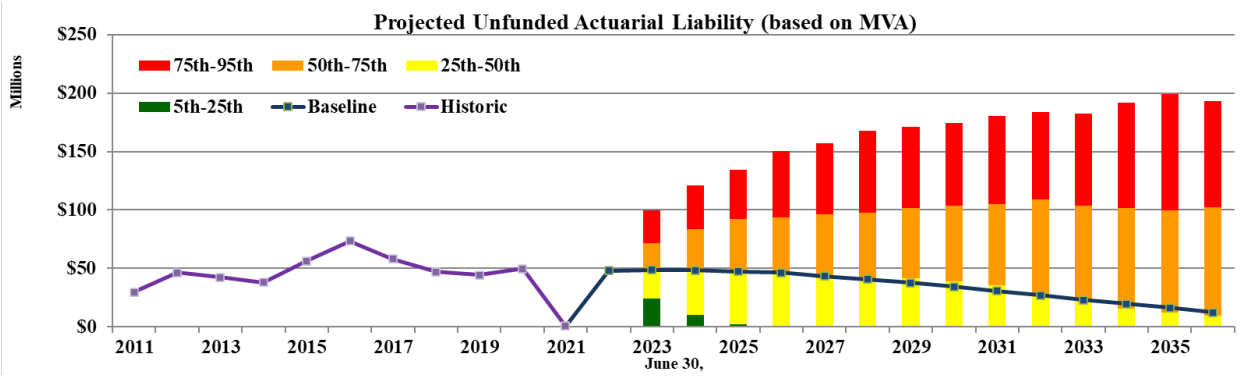
Historic and Stochastic Projection of City Aggregate Contribution Rates



The above chart shows a wide range of potential actuarially determined contributions rates depending on actual investment returns. The range between the 5th and 95th percentile produced from the 2037 valuation is from an actuarially determined contribution rate of 0% to an actuarially determined contribution of over 40%. This range is largely driven by the standard deviation of the investment portfolio of 10.67%.

The next chart shows the historical and stochastically projected unfunded actuarial liability based on the market value of assets. The red range represents the 75th through 95th percentile of the UAL for each year seen among the 1,000 trials. Based on the assumed distribution of investment returns, there is a 5% chance the result will be worse than the top of the red bar and a 5% chance that the result will be better than the bottom of the green bar.

Historic and Stochastic Projection of Unfunded Actuarial Liability



The current contribution policy is expected to slowly pay off the current UAL in future years.

SECTION III – 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, given the risk assessment presented in this report and the discussions with the Board of Trustees during meetings, the advantages of a more detailed assessment may not justify its costs. We would be happy to provide the Board with a more detailed assessment, but the interactive scenarios we have illustrated with P-scan may be sufficient at this time.

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

SECTION IV – ASSETS

The Plan uses and discloses two different asset measurements: the market value and actuarial value of assets. The market value represents the value of the assets if they were liquidated on the valuation date. The actuarial value of assets is a value that smooths annual investment returns over five years to reduce the impact of short-term investment volatility on employer contribution rates. The market value of assets is used primarily for reporting and disclosure, and the actuarial value of assets is used primarily to determine contribution rates.

This section shows the changes in the market value of assets and develops the actuarial value of assets.

Statement of Change in Market Value of Assets

Table IV-1 shows the changes in the market value of assets for the prior fiscal year.

Table IV-1
Changes in Market Values

Value of Assets – July 1, 2021		$ 374,207,055
Additions		
Member Contributions	$ 29,563	
Employer Contributions	11,500,879	
Investment Income	(40,816,815)	
Total Additions	$ (29,286,373)	
Deductions		
Benefit Payments	$ (16,838,482)	
Administrative Expenses	(316,295)	
Total Deductions	$ (17,154,777)	
Value of Assets – July 1, 2022		$ 327,765,905

SECTION IV – ASSETS

Actuarial Value of Assets

To determine on-going contributions, most pension funds utilize an actuarial value of assets that differs from the market value of assets. The actuarial value of assets is based on smoothing year-to-year market value returns for purposes of reducing the resulting volatility on contributions.

The actuarial value of assets is calculated by recognizing the deviation of actual investment returns compared to the expected return over a five-year period. For the July 1, 2017 valuation, the assumed return was lowered to 6.75%, which is the current rate. The dollar amount of the expected return on the market value of assets is determined using actual contributions, benefit payments, and administrative expenses during the year. Any difference between this amount and the actual net investment earnings is considered a gain or loss. Table IV-2 below shows the calculation of the actuarial value of assets. The actuarial value of assets was reset to equal market value as of July 1, 2015.

Table IV-2
Development of Actuarial Value of Assets

1.	Market Value of Assets at July 1, 2021	$ 374,207,055
2.	Employer and Employee Contributions	11,530,442
3.	Benefit Payments and Administrative Expenses	(17,154,777)
4.	Net Cash Flow (2+3)	$ (5,624,335)
5.	Expected Value of investment return at 6.75%	25,072,254
6.	Actual investment return on Market Value	(40,816,815)
7.	Investment gain/(loss) for the year (6-5)	$ (65,889,069)
8.	Investment gain/(loss) from current and prior years to be recognized in the plan year ending June 30, 2022	

Plan Year End	Total Gain/ (Loss)	Deferral Percentage	Deferred to Future Years
June 30, 2022	$ (65,889,069)	80%	$ (52,711,255)
June 30, 2021	49,205,191	60%	29,523,115
June 30, 2020	(8,890,368)	40%	(3,556,147)
June 30, 2019	(1,072,554)	20%	(214,511)
June 30, 2018	4,561,772	0%	0
Total	$ (22,085,028)		$ (26,958,798)

9.	Market Value of Assets for Year ending June 30, 2022	$ 327,765,905
10.	Preliminary Actuarial Value of Assets on July 1, 2022 (9 - 8 deferred)	354,724,703
11.	120% of MV, Upper Limit for Actuarial Value	$ 393,319,086
12.	80% of MV, Lower Limit for Actuarial Value	262,212,724
13.	Actuarial Value of Assets on May 1, 2022	$ 354,724,703

SECTION IV – ASSETS

Investment Performance

The market value of assets (MVA) returned -10.99% during the plan year ending 2022, which is lower than the assumed 6.75% return. The actuarial value of assets (AVA) returned 6.13% during the plan year ending 2022.

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

Table IV-3
Historical Asset Returns

Fiscal Year Ending June 30,	Return on Market Value	Return on Actuarial Value	Assumed Return
2013	14.91%	1.01%	7.00%
2014	14.74%	20.50%	7.00%
2015	3.76%	7.13%	7.00%
2016	-0.21%	5.56%	7.00%
2017	12.53%	6.28%	7.00%
2018	8.46%	6.78%	6.75%
2019	6.38%	6.81%	6.75%
2020	3.78%	6.18%	6.75%
2021	22.82%	10.37%	6.75%
2022	-10.99%	6.13%	6.75%

SECTION V – MEASURES OF LIABILITY

This section presents detailed information on liability measures for the Plan for funding purposes, including:

- Present value of future benefits,
- Actuarial liability, and
- Analysis of changes in the unfunded actuarial liability during the year.

Present Value of Future Benefits: The present value of future benefits represents the expected amount of money needed today to fund all benefits both earned as of the valuation date and expected to be earned in the future by current plan members under the current plan provisions.

Actuarial Liability: The actuarial liability represents the expected amount of money needed today to fund benefits attributed to service prior to the valuation date under the Entry Age actuarial cost method. As such, it is the amount of assets targeted by the actuarial cost method for the Plan to hold as of the valuation date. It is not the amount necessary to settle the obligation.

Table V-1 below shows the present value of future benefits and actuarial liability as of July 1, 2021 and July 1, 2022.

Table V-1
Liabilities Net (Surplus)/Unfunded

	July 1, 2021	July 1, 2022
Present Value of Future Benefits		
Actives	$ 172,028,010	$ 176,789,449
Terminated Vested	37,720,670	35,683,298
Retirees	173,105,649	179,457,638
Disabled	3,398,907	3,556,310
Beneficiaries	12,181,395	12,368,256
Present Value of Future Benefits (PVB)	$ 398,434,631	$ 407,854,951
Actuarial Liability		
Present Value of Future Benefits (PVB)	$ 398,434,631	$ 407,854,951
Present Value of Future Normal Costs (PVFNC)	23,451,398	31,947,396
Actuarial Liability (AL = PVB – PVFNC)	$ 374,983,233	$ 375,907,555
Actuarial Value of Assets (AVA)	339,693,791	354,724,703
Net (Surplus)/Unfunded (AL – AVA)	$ 35,289,442	$ 21,182,852

SECTION V – MEASURES OF LIABILITY

Analysis of Changes in the Actuarial Liability (AL)

The Actuarial Liability (AL) changes at each valuation for a variety of reasons. In each valuation, those elements of change in the AL that have particular significance or could potentially affect the long-term financial outlook of the Plan are reported. Table V-2 shows the components of change in the actuarial liability between July 1, 2021 and July 1, 2022.

Table V-2

	Actuarial Liability
Liabilities July 1, 2021	$ 374,983,233
Liabilities July 1, 2022	375,907,555
Liability Increase/(Decrease)	**924,322**
Change Due to:	
Plan Changes	0
Assumption Changes	(15,748,524)
Accrual of Benefits	3,906,160
Actual Benefit Payments	(16,838,482)
Expected Interest	25,016,015
Actuarial (Gain)/Loss	4,589,153
Total	**924,322**

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

Table V-3
(Gain)/Loss by Source as of July 1, 2022

Turnover	621,385
Retirement	988,068
Disability	58,135
Pre-retirement mortality	489,880
Post-retirement mortality	(1,207,733)
Salary increase more/(less) than expected for continuing actives	1,839,180
New entrants	1,096,224
Continuing payees	2,199,527
Benefit payments more/(less) than expected	(1,574,956)
Data composition & miscellaneous changes	79,443
Total (Gain)/Loss	**$ 4,589,153**

SECTION VI – 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 of the Plan. Typically, the actuarial process will use a funding method that will result in a pattern of contributions that are both stable and predictable.

For this Plan, the funding method employed is the **Entry Age Actuarial Cost Method**. Under this method, there are three primary components to the total actuarially determined 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 Plan, 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. The sum of each member's normal cost is divided by the expected payroll to generate a total normal cost rate for the Plan. Finally, the total normal cost rate is reduced by the member contribution rate to produce the employer's normal cost rate.

The administrative expense rate is determined by dividing the administrative expenses for the prior year (rounded to the nearest $5,000) by expected payroll.

The difference between the Entry Age actuarial liability and the actuarial value of assets is the unfunded actuarial liability. The unfunded actuarial liability is amortized using a 20-year layered amortization method beginning at July 1, 2017, except with respect to the Plan change increase for the plan year ending June 30, 2013, which is amortized over a closed 20-year amortization period starting July 1, 2013. The calculated amortization payment is divided by the expected payroll to produce the unfunded actuarial liability rate.

We understand that the contribution policy of the participating employers is as follows:

- For calendar years prior to 2020, Jackson County, made a contribution based on total budgeted payroll (i.e., not just pension payroll). The contribution was 9% of general employee budgeted payroll and a contribution rate determined annually for other employee payroll which may or may not be equal to the most recent actuarially determined employer contribution rate. For employers other than the County, contributions were made at the actuarially determined rate.
- For calendar years beginning 2020 and later, the County and all other employers contribute the actuarially determined contribution rate determined in the prior year's actuarial valuation. For calendar year 2022 the rate is 11.52% which was the actuarially determined rate from the July 1, 2021 actuarial valuation.

SECTION VI – CONTRIBUTIONS

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

Table VI-1
Development of Plan Contribution Rate as Percentage of Payroll

	July 1, 2021	July 1, 2022
1. Normal Cost (Monthly):		
a. Total Normal Cost	5.82%	6.80%
b. Administrative Expense	0.32%	0.45%
c. Expected Members Contribution	0.04%	0.04%
d. Employer Normal Cost Rate [(a) + (b) - (c)]	6.10%	7.21%
2. Amortization of Unfunded Liability	5.42%	3.79%
3. Actuarially Determined Contribution Rate [(1) + (2)]	11.52%	11.00%

For purposes of calculating the Actuarially Determined Contribution under GASB, the Unfunded Actuarial Liability is amortized in accordance with the schedule below:

Plan Changes on July 1, 2013	20-year closed amortization
Remaining UAL starting July 1, 2017	20-year layered amortization

Amortization payments as of July 1, 2022 are shown in the table below.

Table VI-2
Unfunded Actuarial Liability Amortization Schedule

Item	Date Created	Initial Years	Initial Balance	Remaining Years	Outstanding Balance	Amortization Payment	Amortization Factor
2013 COLA Change	7/1/2013	20	$ 10,349,101	11	$ 7,295,017	$ 932,261	7.825
2017 Initial UAL	7/1/2017	20	48,941,111	15	41,921,258	4,395,922	9.536
2018 (Gain)/Loss	7/1/2018	20	(4,863,012)	16	(4,323,784)	(436,799)	9.899
2019 (Gain)/Loss	7/1/2019	20	(2,227,424)	17	(2,048,360)	(200,069)	10.238
2020 (Gain)/Loss	7/1/2020	20	97,613	18	92,553	8,768	10.556
2021 (Gain)/Loss	7/1/2021	20	(9,469,772)	19	(9,232,396)	(850,581)	10.854
2022 (Gain)/Loss	7/1/2022	20	3,227,087	20	3,227,087	289,859	11.133
2022 Assumption Change	7/1/2022	20	(15,748,524)	20	(15,748,524)	(1,414,543)	11.133
Total			**$ 30,306,180**		**$ 21,182,852**	**$ 2,724,818**	

SECTION VII – ACTUARIAL SECTION OF THE ACFR

The Government Finance Officers Association (GFOA) maintains a checklist of items to be included in the Plan's Annual Comprehensive Financial Report (ACFR) in order to receive recognition for excellence in financial reporting. We have included certain schedules in this section for possible inclusion with the Plan's audited financial statements.

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

Table VII-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	July 1, 2022
Actuarial cost method	Entry Age
Amortization method	20-year layered amortization, level dollar for changes to the UAL on or after 7/1/2017 (20-year closed amortization for 2013 COLA change)
Asset valuation method	5-year smoothed market Reset to market value at 7/1/2015
Actuarial assumptions:	
Investment rate of return	6.75%
Projected salary increases	Ranges from 3.00% to 6.00%
Cost-of-living adjustments	1.75%
Inflation	2.50%

The actuarial assumptions used have been based upon recommendations by the actuary and adopted by the Plan's Board of Trustees. The most recent actuarial experience study was performed for the period July 1, 2016 through June 30, 2021.

The rate of employer actuarially determined contributions to the Plan 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.

SECTION VII – ACTUARIAL SECTION OF THE ACFR

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

Actuarial Valuation Date	Investment Income	Combined Liability Experience	Total Financial Experience	Non-Recurring Items	Total Experience
7/1/2016	$ (3,512,091)	$ 3,623,487	$ 111,396	$ (3,548,174)	$ (3,436,778)
7/1/2017	(1,835,328)	(5,125,099)	(6,960,427)	7,234,328	273,901
7/1/2018	67,450	4,307,023	4,374,473	0	4,374,473
7/1/2019	156,784	1,543,227	1,700,011	0	1,700,011
7/1/2020	(1,683,289)	(41,495)	(1,724,784)	0	(1,724,784)
7/1/2021	11,200,166	(5,112,194)	6,087,972	0	6,087,972
7/1/2022	(2,087,362)	(4,589,153)	(6,676,515)	15,748,524	9,072,009

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

Valuation Date July 1,	Inactive Members (1)	Active Members (2)	Reported Assets (AVA)	Portion of Actuarial Liabilities Covered by Reported Assets (1)	(2)
2013	$ 100,341	$ 150,210	$ 192,022	100%	61%
2014	112,893	162,629	230,044	100%	72%
2015	130,241	170,782	244,567	100%	67%
2016	167,489	147,533	255,800	100%	60%
2017	184,498	142,894	269,223	100%	59%
2018	197,785	137,794	283,837	100%	62%
2019	206,342	139,697	298,074	100%	66%
2020	217,595	140,387	311,516	100%	67%
2021	226,407	148,577	339,694	100%	76%
2022	231,066	144,842	354,725	100%	85%

Amounts prior to 7/1/2016 were calculated by the prior actuary

SECTION VII – ACTUARIAL SECTION OF THE ACFR

Table VII-4
Schedule of Employer Contributions

Plan Year Ended April 30	Actuarially Determined Contribution	Actual Contribution	Percentage Contributed
2014	$ 9,085,877	$ 8,117,005	89.3%
2015	8,326,685	8,479,786	101.8%
2016	9,356,800	8,965,045	95.8%
2017	10,002,450	9,584,406	95.8%
2018	9,436,744	9,885,962	104.8%
2019	9,006,464	9,383,418	104.2%
2020	8,872,315	10,318,596	116.3%
2021	8,806,636	11,954,596	135.7%
2022	8,188,992	11,500,879	140.4%
2023	7,914,444	--	--

Amounts prior to 7/1/2016 were calculated by the prior actuary

Table VII-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)
7/1/2013	$ 192,022,046	$ 250,552,204	$ 58,530,158	76.64%	$ 62,914,553	93.03%
7/1/2014	230,044,430	275,523,422	45,478,992	83.49%	61,267,909	74.23%
7/1/2015	244,566,704	301,023,680	56,456,976	81.25%	60,503,534	93.31%
7/1/2016	255,800,290	315,021,758	59,221,468	81.20%	60,510,891	97.87%
7/1/2017	269,222,703	327,392,074	58,169,371	82.23%	66,315,839	87.72%
7/1/2018	283,836,837	335,578,550	51,741,713	84.58%	64,516,217	80.20%
7/1/2019	298,073,502	346,039,431	47,965,929	86.14%	66,459,289	72.17%
7/1/2020	311,515,839	357,982,341	46,466,502	87.02%	66,818,179	69.54%
7/1/2021	339,693,791	374,983,233	35,289,442	90.59%	71,084,998	49.64%
7/1/2022	354,724,703	375,907,555	21,182,852	94.36%	71,949,487	29.44%

Amounts prior to 7/1/2016 were calculated by the prior actuary

APPENDIX A – MEMBERSHIP INFORMATION

Jackson County, Missouri Revised Pension Plan Active Member Data			
Males	**7/1/2021**	**7/1/2022**	**% change**
Non-Elected Officials			
Number	621	601	-3.22%
Average Age	47.85	48.35	1.03%
Average Service	12.45	12.54	0.72%
Annual Expected Payroll	$ 37,601,440	$ 38,780,342	3.14%
Average Expected Payroll	$ 60,550	$ 64,526	6.57%
Elected Officials			
Number	6	6	0.00%
Average Age	62.56	63.56	1.60%
Average Service	11.36	12.36	8.80%
Annual Expected Payroll	$ 466,971	$ 485,588	3.99%
Average Expected Payroll	$ 77,829	$ 80,931	3.99%
Total			
Number	627	607	-3.19%
Average Age	47.99	48.50	1.05%
Average Service	12.44	12.54	0.79%
Annual Expected Payroll	$ 38,068,411	$ 39,265,930	3.15%
Average Expected Payroll	$ 60,715	$ 64,689	6.54%
Females	**7/1/2021**	**7/1/2022**	**% change**
Non-Elected Officials			
Number	615	570	-7.32%
Average Age	48.46	48.85	0.81%
Average Service	11.98	12.22	1.95%
Annual Expected Payroll	$ 32,777,305	$ 32,433,648	-1.05%
Average Expected Payroll	$ 53,296	$ 56,901	6.76%
Elected Officials			
Number	3	3	0.00%
Average Age	55.64	56.64	1.80%
Average Service	13.06	14.06	7.66%
Annual Expected Payroll	$ 239,281	$ 249,908	4.44%
Average Expected Payroll	$ 79,760	$ 83,303	4.44%
Total			
Number	618	573	-7.28%
Average Age	48.49	48.89	0.82%
Average Service	11.99	12.23	1.99%
Annual Expected Payroll	$ 33,016,586	$ 32,683,556	-1.01%
Average Monthly Benefit	$ 53,425	$ 57,039	6.77%

APPENDIX A – MEMBERSHIP INFORMATION

Jackson County, Missouri Revised Pension Plan Active Member Data (cont.)					
Total		**7/1/2021**		**7/1/2022**	**% change**
Non-Elected Officials					
Number		1,236		1,171	-5.26%
Average Age		48.15		48.59	0.91%
Average Service		12.22		12.39	1.35%
Annual Expected Payroll	$	70,378,745	$	71,213,990	1.19%
Average Expected Payroll	$	56,941	$	60,815	6.80%
Elected Officials					
Number		9		9	0.00%
Average Age		60.25		61.25	1.66%
Average Service		11.93		12.93	8.39%
Annual Expected Payroll	$	706,252	$	735,496	4.14%
Average Expected Payroll	$	78,472	$	81,722	4.14%
Total					
Number		1,245		1,180	-5.22%
Average Age		48.24		48.69	0.93%
Average Service		12.22		12.39	1.40%
Annual Expected Payroll	$	71,084,998		71,949,487	1.22%
Average Expected Payroll	$	57,096	$	60,974	6.79%

APPENDIX A – MEMBERSHIP INFORMATION

Jackson County, Missouri Revised Pension Plan Inactive Member Data		7/1/2021		7/1/2022	% change
Vested Terminated Members					
Number		1,155		1,099	-4.85%
Average Age		52.92		52.65	-0.51%
Total Deferred Monthly Benefit	$	456,796	$	453,554	-0.71%
Average Deferred Monthly Benefit	$	395	$	413	4.35%
Retired & Disabled					
Number		1,315		1,374	4.49%
Average Age		70.72		70.86	0.20%
Total Monthly Benefit	$	1,242,207	$	1,351,827	8.82%
Average Monthly Benefit	$	945	$	984	4.15%
Beneficiaries					
Number		172		181	5.23%
Average Age		68.29		68.93	0.94%
Total Monthly Benefit	$	120,846	$	130,036	7.60%
Average Monthly Benefit	$	703	$	718	2.25%
Total Inpay					
Number		1,487		1,555	4.57%
Average Age		70.44		70.64	0.28%
Total Monthly Benefit	$	1,363,054	$	1,481,863	8.72%
Average Monthly Benefit	$	917	$	953	3.96%

Benefits provided in July 1 valuation data

APPENDIX A – MEMBERSHIP INFORMATION

Jackson County, Missouri Revised Pension Plan
by Age and Service as of July 1, 2022

AVERAGE SALARY BY AGE/SERVICE
TOTAL

Age	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	49,299	0	0	0	0	0	0	0	0	49,299
25 to 29	49,628	50,917	0	0	0	0	0	0	0	49,941
30 to 34	53,513	58,483	55,728	0	0	0	0	0	0	55,783
35 to 39	60,758	65,692	67,469	51,837	44,192	0	0	0	0	62,997
40 to 44	61,360	67,232	63,210	60,254	52,714	0	0	0	0	62,840
45 to 49	52,087	65,512	61,078	60,340	68,256	69,414	0	0	0	61,696
50 to 54	59,990	65,584	73,636	66,730	66,416	74,257	50,354	76,876	0	67,063
55 to 59	56,991	54,482	62,264	58,221	58,635	74,662	67,609	66,744	40,531	59,515
60 to 64	64,371	61,969	58,639	69,693	61,714	51,430	62,543	70,836	74,976	63,082
65 to 69	48,070	64,681	61,397	59,377	50,768	80,986	70,660	77,078	77,030	63,156
70 & up	57,753	64,533	40,814	31,824	48,905	56,206	0	0	85,914	54,824
Total	55,905	61,678	63,081	61,275	61,337	67,160	65,583	71,763	74,686	60,974

Jackson County, Missouri Revised Pension Plan
by Age and Service as of July 1, 2022

COUNTS BY AGE/SERVICE
TOTAL

Age	0 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	12	0	0	0	0	0	0	0	0	12
25 to 29	56	18	0	0	0	0	0	0	0	74
30 to 34	64	54	9	0	0	0	0	0	0	127
35 to 39	52	41	23	7	1	0	0	0	0	124
40 to 44	29	42	24	19	10	0	0	0	0	124
45 to 49	28	33	18	22	21	6	0	0	0	128
50 to 54	29	34	21	21	35	21	2	3	0	166
55 to 59	34	47	23	17	26	8	16	10	1	182
60 to 64	22	21	28	17	21	14	9	14	8	154
65 to 69	9	8	8	6	9	3	5	9	4	61
70 & up	5	6	3	3	5	4	0	0	2	28
Total	340	304	157	112	128	56	32	36	15	1,180

APPENDIX A – MEMBERSHIP INFORMATION

Jackson County, Missouri Revised Pension Plan
by Age and Service as of July 1, 2022

COUNTS BY AGE/SERVICE
MALES

Age	0 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	7	0	0	0	0	0	0	0	0	7
25 to 29	32	14	0	0	0	0	0	0	0	46
30 to 34	33	23	6	0	0	0	0	0	0	62
35 to 39	29	23	15	5	1	0	0	0	0	73
40 to 44	10	21	15	5	4	0	0	0	0	55
45 to 49	9	14	9	12	11	3	0	0	0	58
50 to 54	18	17	9	11	20	13	2	3	0	93
55 to 59	13	18	13	11	12	4	8	4	1	84
60 to 64	13	15	17	4	9	5	5	7	5	80
65 to 69	4	5	5	3	2	1	4	6	2	32
70 & up	2	4	3	2	4	1	0	0	1	17
Total	170	154	92	53	63	27	19	20	9	607

Jackson County, Missouri Revised Pension Plan
by Age and Service as of July 1, 2022

COUNTS BY AGE/SERVICE
FEMALES

Age	0 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	5	0	0	0	0	0	0	0	0	5
25 to 29	24	4	0	0	0	0	0	0	0	28
30 to 34	31	31	3	0	0	0	0	0	0	65
35 to 39	23	18	8	2	0	0	0	0	0	51
40 to 44	19	21	9	14	6	0	0	0	0	69
45 to 49	19	19	9	10	10	3	0	0	0	70
50 to 54	11	17	12	10	15	8	0	0	0	73
55 to 59	21	29	10	6	14	4	8	6	0	98
60 to 64	9	6	11	13	12	9	4	7	3	74
65 to 69	5	3	3	3	7	2	1	3	2	29
70 & up	3	2	0	1	1	3	0	0	1	11
Total	170	150	65	59	65	29	13	16	6	573

APPENDIX A – MEMBERSHIP INFORMATION

Jackson County, Missouri Revised Pension Plan
Distribution of Retiree, Disabled and Survivors as of July 1, 2022

Age	Count	Average Monthly Benefit
Under 25	5	$573
25 - 29	2	368
30 - 34	4	641
35 - 39	3	240
40 - 44	5	822
45 - 49	5	881
50 - 54	5	594
55 - 59	93	853
60 - 64	237	1,094
65 - 69	395	958
70 - 74	367	1,101
75 - 79	233	876
80+	201	687
Total	1,555	$953

Jackson County, Missouri Revised Pension Plan
Distribution of Vested Terminated Members as of July 1, 2022

Age	Count	Average Deferred Monthly Benefit
Under 25	0	$0
25 - 29	5	331
30 - 34	38	343
35 - 39	87	370
40 - 44	119	409
45 - 49	157	471
50 - 54	212	504
55 - 59	234	441
60 - 64	165	340
65+	82	217
Total	1,099	$413

APPENDIX A – MEMBERSHIP INFORMATION

Jackson County, Missouri Revised Pension Plan
Change in Plan Membership

	Actives	Vested Terminations	Disabilities	Retirees	Beneficiaries	Total
July 1, 2021	**1,245**	**1,155**	**37**	**1,278**	**172**	**3,887**
New Entrants	100	0	0	0	0	100
Rehires	2	(2)	0	0	0	0
Terminated Vested	(43)	43	0	0	0	0
Terminated Non-Vested	(67)	0	0	0	0	(67)
Disabilities	(1)	(1)	2	0	0	0
Retirements	(54)	(46)	0	100	0	0
Death with Survivor	(2)	(1)	0	(15)	18	0
Death without Survivor	0	(46)	(2)	(28)	(2)	(78)
Benefit Ceased	0	0	0	0	(7)	(7)
Miscellaneous Adjustments	0	(3)	0	2	0	(1)
July 1, 2022	**1,180**	**1,099**	**37**	**1,337**	**181**	**3,834**

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

The assumptions and methods used in this actuarial valuation were adopted at the May 19, 2022 Board meeting based on recommendations from our Experience Study covering plan experience during the period from July 1, 2016 through June 30, 2021.

A. Actuarial Assumptions

1. Discount Rate

6.75%, including inflation at 2.50%

2. Salary Increases

Total Wage Growth: 3.00%, including inflation at 2.50% and real wage growth of 0.50%.

Total assumed salary increases including step and promotional increases are based upon service and shown in the table below.

Salary Increase Rates by Service			
Service	Rate	Service	Rate
0	6.00%	15	3.95
1	5.85	16	3.85
2	5.70	17	3.75
3	5.55	18	3.65
4	5.40	19	3.55
5	5.25	20	3.45
6	5.10	21	3.40
7	4.95	22	3.35
8	4.80	23	3.30
9	4.65	24	3.25
10	4.50	25	3.20
11	4.35	26	3.15
12	4.25	27	3.10
13	4.15	28	3.05
14	4.05	29+	3.00

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

3. Rates of Mortality

Healthy Non-Annuitants: 2010 Public General Amount-Weighted Mortality Table for Healthy Employees, projected using Scale MP-2021 on a generational basis.

Healthy Annuitants: 2010 Public General Amount-Weighted Below-Median Mortality Table for Healthy Retirees (multiplied by 1.038 for males and 1.190 for females), projected using Scale MP-2021 on a generational basis.

Disabled: 2010 Public General Amount-Weighted Mortality Table for Disabled Retirees, projected using Scale MP-2021 on a generational basis.

4. Rates of Retirement

Rates of Retirement by Age and Service

Age	Age Plus Service Less than 80 Points	Age Plus Service Equals 80 Points	Age Plus Service Greater than 80 Points
55	5.00%	17.50%	15.00%
56	5.00	17.50	10.00
57	5.00	17.50	10.00
58	5.00	17.50	10.00
59	5.00	17.50	10.00
60	7.50	17.50	10.00
61	10.00	17.50	10.00
62	10.00	17.50	15.00
63	10.00	17.50	15.00
64	10.00	17.50	15.00
65	30.00	32.50	32.50
66	30.00	32.50	32.50
67	25.00	25.00	25.00
68	15.00	20.00	20.00
69	15.00	20.00	20.00
70 & over	100.00	100.00	100.00

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

5. Rates of Disability

Rates of Disability at Select Ages	
Age	Disability
20	0.025%
25	0.025
30	0.050
35	0.075
40	0.100
45	0.200
50	0.300
55	0.300
60	0.300
65	0.300
70	0.000

6. Rates of Termination

Rates of Termination	
Service	Termination
0	22.50%
1	22.50
2	20.00
3	17.50
4	13.50
5	13.50
6	10.00
7	10.00
8	10.00
9	10.00
10	7.50
11	7.50
12	7.50
13	6.00
14	5.00
15	5.00
16	5.00
17	5.00
18	5.00
19	5.00
20 or more	3.00

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

7. Retirement Age for Inactive Vested Members

61

8. Administrative Expenses

$315,000 is added to the normal cost of the Plan for expected administrative expenses, which is based upon the actual administrative expenses paid during the prior plan year rounded to the nearest $5,000.

9. Cost of Living Adjustment

Benefits are assumed to increase after retirement at a rate of 1.75% per year.

10. Changes Since Last Valuation

All assumptions have been revised based on the results of the experience study conducted for the period from July 1, 2016 to June 30, 2021.

B. Rationale for Assumptions

1. Economic Assumptions

The investment return assumption of 6.75% 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 3.00% was based upon the inflation assumption of 2.5% plus a real wage growth assumption of 0.50% 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 2016-2021, which was presented to the Board of Trustees at their meeting of May 19, 2022.

C. Disclosures regarding Models Used

In accordance with the Actuarial Standard of Practice (ASOP) 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

Contribution Allocation Procedure

The contribution allocation procedure primarily consists of an actuarial cost method, an asset smoothing method, and an amortization method as described below.

1. **Actuarial Cost Method**

   The Entry Age actuarial cost method was used for active employees, whereby the normal cost is computed as the level annual percentage of pay required to fund the retirement benefits between each member's date of hire and assumed retirement. The actuarial liability is the difference between the present value of future benefits and the present value of future normal costs. Or, equivalently, it is the accumulation of normal costs for all periods prior to the valuation date. The normal cost and actuarial liability are calculated on an individual basis. The sum of the individual amounts is the normal cost and actuarial liability for the Plan. The actuarial liability for the Plan represents the target amount of assets the Plan should have as of the valuation date according to the actuarial cost method.

2. **Asset Valuation Method**

   For the purpose of determining contribution rates and amounts, an actuarial value of assets is used that dampens the volatility in the market value of assets, resulting in a smoother pattern of contribution rates.

   The actuarial value of assets is calculated by recognizing 20% of the difference in each of the prior four years of actual investment returns compared to the expected return on the market value of assets. An adjustment is made so that the final actuarial value of assets is at least 80%, but not more than 120% of the market value of assets.

   The asset value was reset to market value as of July 1, 2015.

3. **Amortization Method**

   The unfunded actuarial liability is the difference between the actuarial liability and the actuarial value of assets. An increase in liability due to a plan change in 2013 is being amortized over a closed 20-year amortization period beginning July 1, 2013, as a level dollar amount. The remaining unfunded actuarial liability at July 1, 2017, is amortized over a closed 20-year amortization period, as a level dollar amount. All future actuarial gains and losses, assumption changes, and plan changes are amortized as level dollar amounts over 20-year periods beginning with the valuation date in which they first arise.

4. **Changes Since Last Valuation**

   None

APPENDIX C – SUMMARY OF PLAN PROVISIONS

1. Membership Requirement

12 months of Credited Service

2. Average Monthly Earnings

Non-Elected Officials:	The average of the highest 36 consecutive months of earnings in the last 120 months.
Elected Officials:	Monthly compensation of the incumbent of the same position that the Elected Official last held at the date of retirement.

3. Credited Service

Non-Elected Officials:	Years and completed months of continuous employment after December 31, 1966, plus 75% of years and completed months prior to January 1, 1967.
Elected Officials:	Years and months of continuous employment after December 31, 2003. Service prior to January 1, 2004 is only included if purchased by the participant.

4. Member Contributions

Non-Elected Officials:	None
Elected Officials:	4% of salary, accumulated at 5% interest per annum.

5. Normal Retirement

Eligibility:	Age 55 with 80 points or age 65 regardless of credited service.
Normal Form of Payment:	Single life annuity guaranteed for 60 months.
Amount:	*Non-Elected Officials:* 1.5% of average monthly earnings for each year of credited service, subject to a minimum monthly benefit of $50. *Elected Officials:* 4.167% of average monthly earnings for each year of credited service, up to 12 years, plus 5% of average monthly earnings for each year of credited service in excess of 12 years, up to 4 years.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

6. Early Retirement

Eligibility: Age 55 with 5 years of credited service.

Amount: Accrued benefit reduced by 1/240 per month for each month preceding normal retirement date.

7. Disability Retirement

Eligibility: Five years of service and total and permanent disability of an employee (as defined under the Social Security Act).

Amount: Accrued benefit payable as of the date of disability.

8. Death while an Active Employee

Eligibility: Five years of service.

Amount: Lump sum benefit equal to the present value of the accrued 60 month certain and life benefit.

9. Deferred Retirement

Eligibility: Five years of credited service.

Amount: Accrued benefit payable at Normal Retirement Date.

10. Health Insurance Supplement

Non-Elected Officials: None

Elected Officials: $200 per month paid to all current and future pensioners for the lifetime of the member. Not subject to annual cost-of-living adjustments.

11. Post-Retirement Cost-of-Living Adjustment (COLA):

Eligibility: Members who terminate after July 30, 1990

Timing: July 1

Amount: Amount determined by the Pension Plan Administration Committee, not to exceed 3%.

12. Changes Since Last Valuation

None

APPENDIX D – GLOSSARY OF TERMS

1. Actuarial Assumptions

Estimates of future experience with respect to rates of mortality, disability, turnover, retirement rate, or rates of investment income and salary increases. Demographic Actuarial Assumptions (rates of mortality, disability, turnover, and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (price inflation, wage inflation, and investment income) are generally based on expectations for the future that may differ from the Plan's past experience.

2. Actuarial Cost Method

A mathematical budgeting procedure for allocating the dollar amount of the Present Value of Future Benefits between future Normal Costs and Actuarial Liability.

3. Actuarially Determined Contribution

The payment to the Plan as determined by the actuary using a Contribution Allocation Procedure. It may or may not be the actual amount contributed to the Plan.

4. Actuarial Gain (Loss)

The difference between actual experience and the anticipated experience based on the Actuarial Assumptions during the period between two actuarial valuation dates.

5. Actuarial Liability

The Actuarial Liability is the difference between the Present Value of Future Benefits and the present value of total future Normal Costs. This is also referred to by some actuaries as the "accrued liability" or "actuarial accrued liability." The Actuarial Liability represents the present value of benefits already earned as of a valuation date according to the Actuarial Cost Method.

6. Actuarial Present Value

The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at the discount rate and by probabilities of payment.

7. Amortization Method

A method for determining the amount, timing, and pattern of payment of the Unfunded Actuarial Liability.

APPENDIX D – GLOSSARY OF TERMS

8. Asset Valuation Method

The method used to develop the actuarial value of assets from the market value of assets typically by smoothing investment returns above or below the assumed rate of return over a period of time.

9. Contribution Allocation Procedure

A procedure typically using an Actuarial Cost Method, an Asset Valuation Method, and an Amortization Method to develop the Actuarially Determined Contribution.

10. Discount Rate

The rate of interest used to discount future benefit payments to determine the Actuarial Present Value. For purposes of determining an Actuarially Determined Contribution, the Discount Rate is typically based on the long-term expected return on assets.

11. Funded Status or Funding Ratio

Either the market or actuarial value of assets divided by Actuarial Liability. For purposes of this report, the Funded Status represents the proportion of the actual assets compared to the target established by the Actuarial Cost Method as of the valuation date. These measures are for contribution budgeting purposes and are not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

12. Normal Cost

The portion of the Present Value of Future Benefits allocated to the current year by the Actuarial Cost Method.

13. Present Value of Future Benefits

The Actuarial Present Value of all benefits both earned as of the valuation date and expected to be earned in the future by current plan members based on current plan provisions and Actuarial Assumptions.

14. Unfunded Actuarial Liability (UAL)

The unfunded actuarial liability is the difference between Actuarial Liability and either the market or the actuarial value of assets. This value is sometimes referred to as "unfunded actuarial accrued liability." It represents the difference between the actual assets and the amount of assets expected by the Actuarial Cost Method as of the valuation date.

Classic Values, Innovative Advice