State Police Retirement System (SPRS)

Actuarial Valuation Report as of June 30, 2023

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December 5, 2023

Board of Trustees
Kentucky Retirement Systems
Perimeter Park West
1260 Louisville Road
Frankfort, KY 40601

Subject: **Actuarial Valuation as of June 30, 2023**

Dear Trustees of the Board:

This report describes the current actuarial condition of the State Police Retirement System (SPRS) and provides the actuarially determined employer contribution rate for fiscal years ending June 30, 2025 and June 30, 2026. In addition, the report analyzes changes in SPRS's financial condition, and provides various summaries of the data.

Separate reports are issued with regard to valuation results determined in accordance with Governmental Accounting Standards Board (GASB) Statements 67, 68, 74 and 75. Results of this report should not be used for any other purpose without consultation with the undersigned. Valuations are prepared annually as of June 30, the first day of the plan year for SPRS. This report was prepared at the request of the Board of Trustees of the Kentucky Retirement Systems (Board) and is intended for use by the Kentucky Public Pensions Authority (KPPA) staff and those designated or approved by the Board.

Financing Objectives and Funding Policy

The employer contribution rates determined by these actuarial valuations are intended to become effective twelve months after the valuation date and, as such, are intended to be used by the Board for recommending required contribution rates effective July 1, 2024, as well as the subsequent fiscal year beginning July 1, 2025 and ending June 30, 2026.

The employer contribution rate is determined in accordance with Section 61.565 of Kentucky Statute. As specified by the Statute, the employer contribution is comprised of a normal cost contribution and an actuarial accrued liability contribution. The actuarial accrued liability contribution is calculated by amortizing the unfunded accrued liability as of June 30, 2019 over a closed 30-year amortization period (26 years remaining as of June 30, 2023). Gains and losses incurring in years after June 30, 2019 are amortized as separate closed 20-year amortization bases.

5605 North MacArthur Boulevard | Suite 870 | Irving, Texas 75038-2631

If the contributions made are equal to the Actuarially Determined Contribution (ADC), and if all actuarial assumptions are met, there will not be an unfunded accrued liability at the end of the 26-year period remaining from the original closed 30-year amortization base. Accordingly, the ADC under the funding policy can be considered a "Reasonable Actuarially Determined Contribution" as required by the Actuarial Standards of Practice.

ASSUMPTIONS AND METHODS

The Board of Trustees, in consultation with the actuary, sets the actuarial assumptions and methods used in the actuarial valuation. Except where noted in this report, the assumptions used in this actuarial valuation are based on an experience study conducted with experience through June 30, 2022, adopted by the Board of Trustees on June 5, 2023 for first use in this June 30, 2023 actuarial valuation.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can, and almost certainly will, differ as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rate, and funding periods. The actuarial calculations are intended to provide information for rational decision making.

BENEFIT PROVISIONS

The benefit provisions reflected in these valuations are those which were in effect on June 30, 2023. House Bill 506 passed during the 2023 legislative session and reinstated the Partial Lump Sum Option Form of payment for members who retire on and after January 1, 2024, and adjusted the minimum required separation period before a retiree may become reemployed and continue to receive their retirement allowance to one month for all circumstances. There were no other material benefit provision changes since the prior valuation.

DATA

Member data for retired, active and inactive members was supplied as of June 30, 2023, by KPPA staff. The staff also supplied asset information as of June 30, 2023. We did not audit this data, but we did apply a number of tests to the data, and we concluded that it was reasonable and consistent with the prior year's data. GRS is not responsible for the accuracy or completeness of the information provided to us by KPPA.

CERTIFICATION

We certify that the information presented herein is accurate and fairly portrays the actuarial position of SPRS as of June 30, 2023.

All of our work conforms with generally accepted actuarial principles and practices, and is in conformity with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of Kentucky Code of Laws and, where applicable, the Internal Revenue Code, ERISA, and the Statements of the Governmental Accounting Standards Board.

To the best of our knowledge, this report is complete and accurate and is in accordance with generally recognized actuarial practices and methods. Mr. White and Ms. Shaw are Enrolled Actuaries. All three of the undersigned are members of the American Academy of Actuaries and meet all of the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. In addition, all three are independent of KPPA and are experienced in performing valuations for large public retirement systems. This communication shall not be construed to provide tax advice, legal advice or investment advice.

Sincerely,

Gabriel, Roeder, Smith & Company

Daniel J. White, FSA, EA, MAAA
Senior Consultant

Janie Shaw, ASA, EA, MAAA
Consultant

Krysti Kiesel, ASA, MAAA
Senior Analyst and Actuary

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SECTION 1

EXECUTIVE SUMMARY

Summary of Principal Results

(Dollar amounts expressed in thousands)

	SPRS	
	June 30, 2023	June 30, 2022
Actuarially Determined Contribution:		
Retirement	65.79%	85.39%
Insurance	2.31%	3.68%
Total	68.10%	89.07%
Contribution Rate for Next Fiscal Year[1]	68.10%	99.43%
Assets:		
Retirement		
• Actuarial value (AVAR)	$589,848	$559,973
• Market value (MVAR)	$591,514	$551,699
• Ratio of actuarial to market value of assets	99.7%	101.5%
Insurance		
• Actuarial value (AVAI)	$245,172	$234,239
• Market value (MVAI)	$248,109	$231,242
• Ratio of actuarial to market value of assets	98.8%	101.3%
Funded Status:		
Retirement		
• Actuarial accrued liability	$1,091,795	$1,067,447
• Unfunded accrued liability on AVAR	$501,947	$507,474
• Funded ratio on AVAR	54.0%	52.5%
• Unfunded accrued liability on MVAR	$500,281	$515,748
• Funded ratio on MVAR	54.2%	51.7%
Insurance		
• Actuarial accrued liability	$244,059	$232,798
• Unfunded accrued liability on AVAI	($1,113)	($1,441)
• Funded ratio on AVAI	100.5%	100.6%
• Unfunded accrued liability on MVAI	($4,050)	$1,556
• Funded ratio on MVAI	101.7%	99.3%
Membership:		
• Number of		
- Active Members	868	844
- Retirees and Beneficiaries	1,697	1,702
- Inactive Members	714	667
- Total	3,279	3,213
• Projected payroll of active members	$65,913	$47,885
• Average salary of active members	$75,937	$56,736

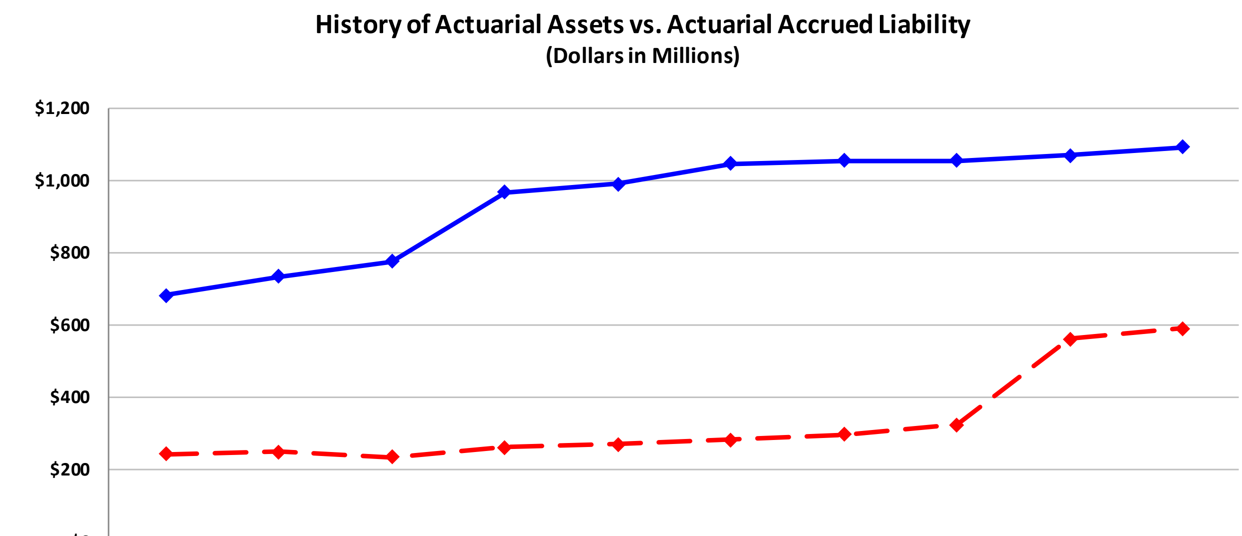
[1] Contribution rates calculated with the June 30, 2023 valuation are effective for fiscal years ending June 30, 2025 and June 30 2026. Contribution rates for fiscal year ending June 30, 2024 calculated with the June 30, 2021 valuation.

Executive Summary (Continued)

Retirement Fund

The unfunded actuarial accrued liability of the retirement fund decreased by $6 million since the prior year's valuation to $502 million. This decrease was approximately $19 million less than expected, primarily due to liability losses as a result of salary increases for individual members being greater than assumed. The increase in the liability due to demographic losses was offset by a decrease in liabilities due to the assumption changes based on the 2022 experience study.

Below is a chart with the historical actuarial value of assets and actuarial accrued liability. The increase in the actuarial value of assets in FY 2022 was due to a one-time $215 million appropriation made by the Commonwealth.



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
AAL	681	734	775	967	990	1,045	1,053	1,053	1,067	1,092
AVA	243	248	235	261	268	282	296	323	560	590

Insurance Fund

The funding surplus (actuarial accrued liability in excess of assets) of the insurance fund decreased by $0.3 million since the prior year's valuation to $1.1 million. The funding surplus was expected to decrease by $6.5 million and therefore was $6.8 lower than expected, primarily due to liability losses related to the 2024 premium experience and retiree contribution changes discussed below. The increase in the liability due to demographic losses was offset by a decrease in liabilities due to the assumption changes based on the 2022 experience study.

On average, pre-Medicare premiums were approximately 7% higher than expected and Medicare premiums were approximately 4% lower than expected. In conjunction with the review of the healthcare per capita claims cost, the assumed increase in future healthcare costs, or trend assumption, is also reviewed on an annual basis. The trend assumption for the pre-Medicare Plans was increased in the 2023 actuarial valuation as a result of our review. These changes increased liability for insurance fund by approximately $12 million.

Additionally, the Board of Trustees adopted to lower the retiree contribution for the Medicare Advantage plans from $252.51 to be based on the Humana premiums ($93.35 as of January 1, 2024). The Board also adopted the Medical Only plan as the KPPA "contribution plan", which further lowered member contributions for those with less than 20 years of service. These changes increased liability for the insurance fund by approximately $3 million.

SECTION 2

DISCUSSION

Discussion

The State Police Retirement System (SPRS) is a defined benefit pension plan that provides coverage for uniformed state police officers. SPRS includes hazardous duty benefits only. This report presents the results of the June 30, 2023 actuarial funding valuation for both the Retirement Fund and Insurance Fund.

The primary purposes of the valuation report are to describe the current actuarial condition of SPRS and provide the actuarially determined employer contribution rates for fiscal years ending June 30, 2025 and June 30, 2026. In addition, the report analyzes changes in SPRS's financial condition, and provides various summaries of the data.

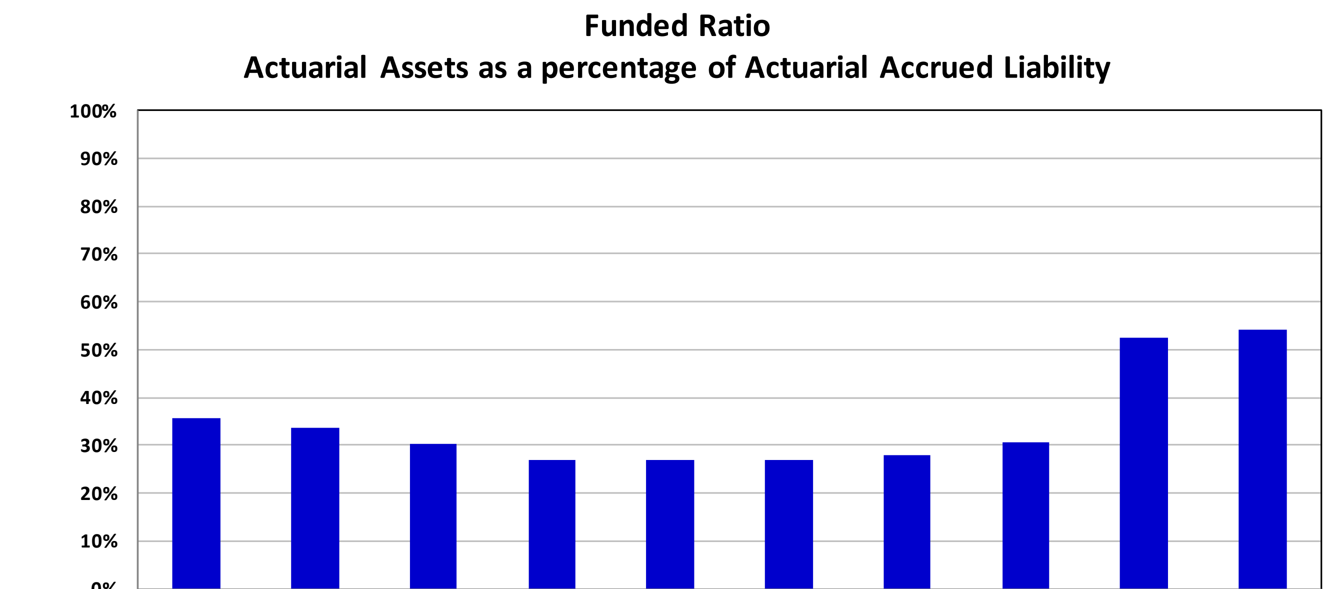
The actuarially determined contribution consist of two components: a normal cost rate and an amortization cost to finance the unfunded actuarial accrued liability. The normal cost rate is the theoretical amount which would be required to pay the members' benefits, based on the current plan provisions, if this amount had been contributed from each member's entry date and if the fund's experience exactly followed the actuarial assumptions. This is the amount that it should cost to provide the benefits for an average member. Since members contribute to the fund, only the excess of the normal cost rate over the member contribution rate is included in the employer contribution. The amortization cost is the amount necessary to amortize the unfunded actuarial accrued liability. The payroll growth rate and discount rate assumptions are selected by the Board. The funding period is specified in Section 61.565 of Kentucky Statute.

All of the actuarial and financial tables referenced by the other sections of this Report appear in Section 3. Section 4 provides additional details related to the calculation of the amortization of the unfunded actuarial accrued liability. Section 5 provides member data and statistical information. Section 6 provides a discussion of various risk measures, which are intended to aid stakeholders in understanding the effects of future experience differing from the assumptions used in performing an actuarial valuation. Appendices A and B provide summaries of the principle actuarial assumptions and methods and plan provisions. Finally, Appendix C provides a glossary of technical terms that are used throughout this report.

Funding Progress

The following chart provides a ten-year history of the retirement fund's funded ratio (i.e. the Actuarial Value of Assets divided by the Actuarial Accrued Liability). The significant increase in the funded ratio from 2021 to 2022 was due to a $215 million appropriation made by the Commonwealth in fiscal year 2022.

Assuming the full actuarially determined contributions are paid in future years and absent material future unfavorable experience, the funded ratio is expected to continue improving. Also, the dollar amount of the unfunded actuarial accrued liability, or the difference between the actuarial accrued liability and the actuarial value of assets, is expected to continue a decreasing trend. Table 9, Schedule of Funding Progress, in the following section of the report provides additional detail regarding the funding progress of the retirement fund.



	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Funded Ratio	35.6%	33.8%	30.3%	27.0%	27.1%	27.0%	28.1%	30.7%	52.5%	54.0%

Asset Gains/ (Losses)

The actuarial value of assets ("AVA") is based on a smoothed market value of assets, using a systematic approach to phase-in the difference between the actual and expected investment return on the market value of assets (adjusted for receipts and disbursements during the year). This is appropriate because it dampens the short-term volatility inherent in investment markets. The return is computed net of investment expenses.

Retirement Fund

The actuarial value of assets for the retirement fund increased from $560 million to $590 million since the prior valuation. The rate of return on the market value of assets on a dollar-weighted basis for the prior fiscal year was 7.4% which is more than the 5.25% expected annual return. The return on an actuarial (smoothed) asset value was 5.5%, which resulted in a $1.4 million gain for the fiscal year. The market value of assets is $1.7 million more than the actuarial value of assets, which signifies that the retirement fund is in a position of net deferred investment gains to be realized in future years.

Table 6 in the following section of this report provides asset information that was included in the annual financial statements of the funds, as well as the estimated yield on a market value basis. Table 7 provides the development of the actuarial value of assets and the estimated yield on an actuarial value basis.

Actuarial Gains/ (Losses)

The annual actuarial valuation is a snapshot analysis of the benefit liabilities, assets and funded position of the funds as of the first day of the plan year. In any one fiscal year, the experience can be better or worse from that which is assumed or expected. The actuarial assumptions do not necessarily attempt to model what the experience will be for any one given fiscal year, but instead try to model the overall experience over many years. Therefore, as long as the actual experience of a retirement system is reasonably close to the current assumptions, the long-term funding requirements of the system will remain relatively consistent.

Below is a table that separately shows a reconciliation of the unfunded liability since the prior actuarial valuation for the retirement and health insurance funds, which include the effect of asset and liability gains and losses, changes in assumptions, and changes in plan provisions. See the discussion in the Executive Summary for additional information related to the liability experience and additional information in this section of the report related to the asset experience, plan changes, and assumption changes.

Experience Gain or (Loss)
(Dollar amounts expressed in thousands)

	Retirement	Insurance
A. Calculation of total actuarial gain or loss		
1. Unfunded actuarial accrued liability (UAAL), previous year	$ 507,474	$ (1,441)
2. Normal cost and administrative expenses	13,164	3,433
3. Less: contributions for the year	(63,370)	(9,637)
4. Interest accrual	25,324	(284)
5. Expected UAAL (Sum of Items 1 - 4)	$ 482,592	$ (7,929)
6. Actual UAAL as of June 30,2023	$ 501,947	$ (1,113)
7. Total gain (loss) for the year (Item 5 - Item 6)	$ (19,355)	$ (6,816)
B. Source of gains and losses		
8. Asset gain (loss) for the year	$ 1,393	$ 1,091
9. Liability experience gain (loss) for the year	(52,004)	(13,544)
10. Plan Change	—	—
11. Assumption change	31,256	5,637
12. Total	$ (19,355)	$ (6,816)

Actuarial Assumptions and Methods

In determining costs and liabilities, actuaries use assumptions about the future, such as rates of salary increase, probabilities of retirement, termination, death and disability, and an annual investment return assumption. The Board of Trustees, in consultation with the actuary, sets the actuarial assumptions and methods used in the actuarial valuation.

An experience study was conducted after the June 30, 2022 actuarial valuation and the Board adopted updated assumptions for use in this actuarial valuation. The updated assumptions include:

Demographic Assumptions:

- Post-retirement mortality rates were updated based on KPPA experience.
- Mortality improvement assumption was updated to the ultimate rates of the MP-2020 mortality improvement scale.
- Rates of termination prior to retirement were increased based on SPRS experience.
- The percentage of members assumed to cover spouses in the retiree health insurance plan at retirement was increased based on SPRS experience.

Economic Assumptions:

- The rate of inflation was increased from 2.30% to 2.50%.
- The salary productivity assumption was reduced by 0.20%, resulting in no change in the salary increase assumption for long-service employees of 3.55%.
- The investment return assumption for the insurance fund was increased from 6.25% to 6.50%.
- The Tier 3 cash balance interest crediting rate assumption was increased to 5.90%.

In conjunction with the review of the healthcare per capita claims cost, the assumed increase in future healthcare costs, or trend assumption, is reviewed on an annual basis. All other assumptions were adopted by the Board and are based on an experience study conducted based on experience through June 30, 2022. It is our opinion that the assumptions are internally consistent, reasonable, and reflect anticipated future experience of the System. Appendix A includes a summary of the actuarial assumptions and methods used in this valuation.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. This report does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

Benefit Provisions

Appendix B of this report includes a summary of the major benefit provisions for System. The following is a summary of the changes in benefits enacted since the last actuarial valuation.

House Bill 506 passed during the 2023 legislative session and reinstated the Partial Lump Sum Option Form of payment for members who retire on and after January 1, 2024, with the lump-sum options expanded to include 48 or 60 times the member's monthly retirement allowance. Since this optional form of payment results in a reduced, actuarial equivalent, monthly retirement allowance for members who elect a partial lump-sum option, this provision does not have a fiscal impact to the accrued liability.

House Bill 506 also adjusted the minimum required separation period before a retiree may become reemployed and continue to receive their retirement allowance to one month for all circumstances for each plan. This is a minimal change for members in SPRS, as the minimum separation period is currently one month for members who become reemployed on a full-time basis in a hazardous position. The requirement was previously three months only for members who become reemployed on a part-time basis or in any non-hazardous position. We believe this provision of House Bill 506 will have an insignificant impact on the retirement pattern of hazardous members.

There were no other material plan provision changes since the prior valuation.

Annual Cost of Tier 3 Pay Credit for Unused Sick Leave
(HB 259 Enacted in the 2022 Legislative Session)

Effective July 1, 2023, members earning benefits in the Tier 3 cash balance plan with five or more years of service credit will receive an additional employer pay credit equal to an amount by multiplying the member's unused sick leave in excess of 480 hours (i.e. 60 days) by the member's hourly base pay. Tier 3 members who retire from the State Police Retirement System will receive an additional employer pay credit equal to an amount by multiplying the member's hours of accumulated sick leave upon termination of employment by the member's hourly base pay.

Section KRS 7A.255 was also amended to require the Department of State Police and the Kentucky Public Pensions Authority to jointly report to the Public Pension Oversight Board on the costs and effectiveness of this benefit provided to the Tier 3 members. The increase in the Tier 3 normal cost rate due to this benefit enhancement is 6.65% of pay. As a result, the dollar amount of this benefit enhancement for FY 2025 is $1,468,000 which is equal to the increase in the Tier 3 normal cost rate multiplied by the $22,077,000 Tier 3 payroll.

The incremental difference in the Tier 3 normal cost rate will remain relatively unchanged in future years, however the amount of the dollar cost of this benefit enhancement will increase over time as the number of members (and covered payroll) increase as new members enter the System and earn Tier 3 benefits.

SECTION 3

ACTUARIAL TABLES

Actuarial Tables

Development of Unfunded Actuarial Accrued Liability

(Dollar amounts expressed in thousands)

		June 30, 2023	
		Retirement (1)	Insurance (2)
1.	Projected payroll of active members	$ 65,913	$ 65,913
2.	Present value of future pay	$ 674,636	$ 611,054
3.	Normal cost rate		
	a. Total normal cost rate	26.97%	5.39%
	b. Less: member contribution rate	-8.00%	-0.57%
	c. Employer normal cost rate	18.97%	4.82%
4.	Actuarial accrued liability for active members		
	a. Present value of future benefits	$ 437,878	$ 91,268
	b. Less: present value of future normal costs	(171,766)	(23,797)
	c. Actuarial accrued liability	$ 266,112	$ 67,471
5.	Total actuarial accrued liability		
	a. Retirees and beneficiaries	$ 814,982	$ 172,154
	b. Inactive members	10,701	4,434
	c. Active members (Item 4c)	266,112	67,471
	d. Total	$ 1,091,795	$ 244,059
6.	Actuarial value of assets	$ 589,848	$ 245,172
7.	Unfunded actuarial accrued liability (UAAL) (Item 5d - Item 6)	$ 501,947	$ (1,113)
8.	Funded Ratio	54.0%	100.5%

Actuarial Present Value of Future Benefits
(Dollar amounts expressed in thousands)

		June 30, 2023	
		Retirement (1)	Insurance (2)
1.	Active members		
	a. Service retirement	$ 415,601	
	b. Deferred termination benefits and refunds	6,438	
	c. Survivor benefits	2,977	
	d. Disability benefits	12,862	
	e. Total	$ 437,878	$ 91,268
2.	Retired members		
	a. Service retirement	$ 736,532	
	b. Disability retirement	11,537	
	c. Beneficiaries	66,913	
	d. Total	$ 814,982	$ 172,154
3.	Inactive members		
	a. Vested terminations	$ 10,178	$ 4,434
	b. Nonvested terminations	523	N/A
	c. Total	$ 10,701	$ 4,434
4.	Total actuarial present value of future benefits	$ 1,263,561	$ 267,856

Development of Actuarially Determined Contribution Rate

		June 30, 2023	
		Retirement	Insurance
		(1)	(2)
1.	Total normal cost rate		
	a. Service retirement	24.17%	
	b. Deferred termination benefits and refunds	1.24%	
	c. Survivor benefits	0.32%	
	d. Disability benefits	1.24%	
	e. Total	26.97%	5.39%
2.	Less: member contribution rate	-8.00%	-0.57%
3.	Total employer normal cost rate	18.97%	4.82%
4.	Administrative expenses	0.44%	0.11%
5.	Net employer normal cost rate	19.41%	4.93%
6.	UAAL amortization contribution rate	46.38%	-2.62%
7.	Total calculated employer contribution	65.79%	2.31%

Actuarial Balance Sheet

Retirement Benefits

(Dollar amounts expressed in thousands)

		June 30, 2023 (1)	June 30, 2022 (2)
1.	Assets - Present and Expected Future Resources		
a.	Current assets (actuarial value)	$ 589,848	$ 559,973
b.	Present value of future member contributions	$ 53,971	$ 39,070
c.	Present value of future employer contributions		
	i. Normal cost contributions	$ 117,795	$ 82,233
	ii. Unfunded accrued liability contributions	501,947	507,474
	iii. Total future employer contributions	$ 619,742	$ 589,707
d.	Total assets	$ 1,263,561	$ 1,188,750
2.	Liabilities - Present Value of Expected Future Benefit Payments		
a.	Active members		
	i. Present value of future normal costs	$ 171,766	$ 121,303
	ii. Accrued liability	266,112	197,247
	iii. Total present value of future benefits	$ 437,878	$ 318,550
b.	Present value of benefits payable on account of current retired members and beneficiaries	$ 814,982	$ 859,688
c.	Present value of benefits payable on account of current inactive members	$ 10,701	$ 10,512
d.	Total liabilities	$ 1,263,561	$ 1,188,750

Actuarial Balance Sheet

Insurance Benefits

(Dollar amounts expressed in thousands)

		June 30, 2023 (1)	June 30, 2022 (2)
1.	Assets - Present and Expected Future Resources		
a.	Current assets (actuarial value)	$ 245,172	$ 234,239
b.	Present value of future member contributions	$ 5,024	$ 3,535
c.	Present value of future employer contributions		
	i. Normal cost contributions	$ 18,773	$ 21,309
	ii. Unfunded accrued liability contributions	(1,113)	(1,441)
	iii. Total future employer contributions	$ 17,660	$ 19,868
d.	Total assets	$ 267,856	$ 257,642
2.	Liabilities - Present Value of Expected Future Benefit Payments		
a.	Active members		
	i. Present value of future normal costs	$ 23,797	$ 24,844
	ii. Accrued liability	67,471	60,134
	iii. Total present value of future benefits	$ 91,268	$ 84,978
b.	Present value of benefits payable on account of current retired members and beneficiaries	$ 172,154	$ 169,471
c.	Present value of benefits payable on account of current inactive members	$ 4,434	$ 3,193
d.	Total liabilities	$ 267,856	$ 257,642

Reconciliation of Net Assets

(Dollar amounts expressed in thousands)[1]

	Year Ending			
	June 30, 2023		June 30, 2023	
	(1)		(2)	
	Retirement		**Insurance**	
1. Value of assets at beginning of year	$	551,699	$	231,242
2. Revenue for the year				
a. Contributions				
i. Member contributions	$	5,250	$	348
ii. Employer contributions		58,120		9,289
iii. Other contributions (less 401h)		0		0
iv. Total	$	63,370	$	9,637
b. Income				
i. Interest, dividends, and other income	$	17,942	$	7,186
ii. Investment expenses		(2,563)		(1,859)
iii. Net	$	15,379	$	5,328
c. Net realized and unrealized gains (losses)		25,329		16,192
d. Total revenue	$	104,079	$	31,156
3. Expenditures for the year				
a. Disbursements				
i. Refunds	$	166	$	0
ii. Regular annuity benefits / Healthcare premiums		63,804		14,290
iii. Other benefit payments[2]		0		(75)
iv. Transfers to other systems		0		0
v. Total	$	63,970	$	14,215
b. Administrative expenses and depreciation		293		74
c. Total expenditures	$	64,263	$	14,289
4. Increase in net assets (Item 2. - Item 3.)	$	39,815	$	16,867
5. Value of assets at end of year (Item 1. + Item 4.)	$	591,514	$	248,109
6. Net external cash flow				
a. Dollar amount	$	(893)	$	(4,652)
b. Percentage of market value		-0.2%		-1.9%
7. Estimated annual return on net assets		7.4%		9.4%

[1] Amounts may not add due to rounding. Retirement assets exclude 401h assets. Insurance assets include 401h assets

[2] Insurance benefit payments have been offset by Medicare Drug Reimbursements, Insurance Premiums, and Humana Gain Share Payments

Development of Actuarial Value of Assets

Retirement Benefits

(Dollar amounts expressed in thousands)*

	Year Ending		June 30, 2023
1.	Actuarial value of assets at beginning of year	$	559,973
2.	Market value of assets at beginning of year	$	551,699
3.	Net new investments		
	a. Contributions	$	63,370
	b. Benefit payments		(63,970)
	c. Administrative expenses		(293)
	d. Subtotal	$	(893)
4.	Market value of assets at end of year	$	591,514
5.	Net earnings (Item 4. - Item 2. - Item 3.d.)	$	40,708
6.	Assumed investment return rate for fiscal year		5.25%
7.	Expected return for immediate recognition	$	28,941
8.	Excess return for phased recognition	$	11,768

9. Phased-in recognition, 20% of excess return on assets for prior years:

	Fiscal Year Ending June 30,		Excess Return		Recognized Amount
a.	2023	$	11,768	$	2,354
b.	2022		(40,859)		(8,172)
c.	2021		46,279		9,256
d.	2020		(8,720)		(1,744)
e.	2019		669		134
f.	Total			$	1,827

10.	Actuarial value of assets as of June 30, 2023 (Item 1. + Item 3.d. + Item 7.+ Item 9.f.)	$	589,848
11.	Ratio of actuarial value to market value		99.7%
12.	Estimated annual return on actuarial value of assets		5.5%

* Amounts may not add due to rounding

Development of Actuarial Value of Assets

Insurance Benefits

(Dollar amounts expressed in thousands)*

	Year Ending		June 30, 2023
1.	Actuarial value of assets at beginning of year	$	234,239
2.	Market value of assets at beginning of year	$	231,242
3.	Net new investments		
	a. Contributions	$	9,637
	b. Benefit payments		(14,215)
	c. Administrative expenses		(74)
	d. Subtotal	$	(4,652)
4.	Market value of assets at end of year	$	248,109
5.	Net earnings (Item 4. - Item 2. - Item 3.d.)	$	21,520
6.	Assumed investment return rate for fiscal year		6.25%
7.	Expected return for immediate recognition	$	14,307
8.	Excess return for phased recognition	$	7,212

9. Phased-in recognition, 20% of excess return on assets for prior years:

	Fiscal Year Ending June 30,		Excess Return		Recognized Amount
a.	2023	$	7,212	$	1,442
b.	2022		(26,141)		(5,228)
c.	2021		37,840		7,568
d.	2020		(11,419)		(2,284)
e.	2019		(1,099)		(220)
f.	Total			$	1,278

10.	Actuarial value of assets as of June 30, 2023 (Item 1. + Item 3.d. + Item 7.+ Item 9.f.)	$	245,172
11.	Ratio of actuarial value to market value		98.8%
12.	Estimated annual return on actuarial value of assets		6.7%

* Amounts may not add due to rounding

Schedule of Funding Progress
(Dollar amounts expressed in thousands)

June 30,	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Accrued Liability (UAAL) (3) - (2)	Funded Ratio (2)/(3)	Annual Covered Payroll	UAAL as % of Payroll (4)/(6)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
			Retirement			
2014	$ 242,742	$ 681,118	$ 438,376	35.6%	$ 44,616	982.6%
2015	248,388	734,156	485,768	33.8%	45,765	1061.4%
2016	234,568	775,160	540,592	30.3%	45,551	1186.8%
2017	261,320	967,145	705,825	27.0%	48,598	1452.4%
2018	268,259	989,528	721,269	27.1%	48,808	1477.8%
2019	282,162	1,045,318	763,156	27.0%	47,752	1598.2%
2020	296,126	1,053,158	757,032	28.1%	46,145	1640.6%
2021	323,250	1,053,259	730,009	30.7%	45,338	1610.1%
2022	559,973	1,067,447	507,474	52.5%	47,885	1059.8%
2023	589,848	1,091,795	501,947	54.0%	65,913	761.5%
			Insurance			
2014	$ 155,595	$ 234,271	$ 78,676	66.4%	$ 44,616	176.3%
2015	167,775	254,839	87,064	65.8%	45,765	190.2%
2016	172,704	257,197	84,493	67.1%	45,551	185.5%
2017	180,464	276,641	96,177	65.2%	48,598	197.9%
2018	187,535	262,088	74,553	71.6%	48,808	152.7%
2019	197,395	276,809	79,414	71.3%	47,752	166.3%
2020	207,018	276,144	69,126	75.0%	46,145	149.8%
2021	223,251	272,406	49,155	82.0%	45,338	108.4%
2022	234,239	232,798	(1,441)	100.6%	47,885	-3.0%
2023	245,172	244,059	(1,113)	100.5%	65,913	-1.7%

Summary of Principal Assumptions and Methods

Below is a summary of the principal economic assumptions, cost method, and the method for financing the unfunded actuarial accrued liability:

Valuation date:	June 30, 2023
Actuarial cost method:	Entry Age Normal
Amortization method:	Level percentage of payroll (0% payroll growth assumed)
Amortization period for contribution rate:	30-year closed period at June 30, 2019 Gains/losses incurring after 2019 will be amortized over separate closed 20-year amortization bases
Asset valuation method:	5-Year Smoothed Market
Actuarial assumptions:	
Investment rate of return, retirement	5.25%
Investment rate of return, insurance	6.50%
Projected salary increases	3.55% to 16.05% (varies by service)
Inflation	2.50%
Post-retirement pension benefit adjustments	0.00%
Retiree Mortality	System-specific mortality table based on mortality experience from 2013 to 2022, projected with the ultimate rates from MP-2020 mortality improvement scale using a base year of 2023.

Solvency Test

(Dollar amounts expressed in thousands)

June 30,	Actuarial Accrued Liability: Active Member Contributions	Retired Members & Beneficiaries	Active Members (Employer Financed)	Valuation Assets	Portion of Aggregate Accrued Liabilities Covered by Assets: Active	Retired	ER Financed
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Retirement							
2014	$ 41,831	$ 563,011	$ 76,276	$ 242,742	100.0%	35.7%	0.0%
2015	41,567	605,855	86,734	248,388	100.0%	34.1%	0.0%
2016	41,871	636,499	96,791	234,568	100.0%	30.3%	0.0%
2017	44,798	773,982	148,365	261,320	100.0%	28.0%	0.0%
2018	43,835	800,788	144,905	268,259	100.0%	28.0%	0.0%
2019	41,948	848,397	154,973	282,162	100.0%	28.3%	0.0%
2020	40,831	863,580	148,747	296,126	100.0%	29.6%	0.0%
2021	42,035	860,801	150,423	323,250	100.0%	32.7%	0.0%
2022	42,027	870,200	155,220	559,973	100.0%	59.5%	0.0%
2023	47,394	825,683	218,718	589,848	100.0%	65.7%	0.0%
Insurance							
2014	$ -	$ 143,402	$ 90,869	$ 155,595	100.0%	100.0%	13.4%
2015	-	170,447	84,392	167,775	100.0%	98.4%	0.0%
2016	-	177,094	80,103	172,704	100.0%	97.5%	0.0%
2017	-	186,390	90,251	180,464	100.0%	96.8%	0.0%
2018	-	183,151	78,937	187,535	100.0%	100.0%	5.6%
2019	-	199,959	76,850	197,395	100.0%	98.7%	0.0%
2020	-	207,638	68,506	207,018	100.0%	99.7%	0.0%
2021	-	206,707	65,699	223,251	100.0%	100.0%	25.2%
2022	-	172,664	60,134	234,239	100.0%	100.0%	100.0%
2023	-	176,588	67,471	245,172	100.0%	100.0%	100.0%

SECTION 4

AMORTIZATION BASES

Amortization of Unfunded Liability

Retirement

Valuation Year Base Established	Original Amortization Base	Remaining at June 30, 2023	Payments for FYE 2025	Funding Period at June 30, 2023
June 30, 2019	$ 763,156	$ 716,633	$ 49,853	26
June 30, 2020	3,748	4,770	420	17
June 30, 2021	(231,783)	(235,486)	(20,021)	18
June 30, 2022	16,308	15,860	1,305	19
June 30, 2023	170	170	(989)	20
Total		$ 501,947	$ 30,568	
Projected Payroll for FYE 2025			$ 65,913	
Amortization Payments as a Percentage of Payroll			46.38%	

Insurance

Valuation Year Base Established	Original Amortization Base	Remaining at June 30, 2023	Payments for FYE 2025	Funding Period at June 30, 2023
June 30, 2019	$ 79,414	$ 71,905	$ 5,633	26
June 30, 2020	(5,896)	(6,061)	(582)	17
June 30, 2021	(18,445)	(19,086)	(1,776)	18
June 30, 2022	(48,536)	(51,961)	(4,698)	19
June 30, 2023	4,090	4,090	(303)	20
Total		$ (1,113)	$ (1,726)	
Projected Payroll for FYE 2025			$ 65,913	
Amortization Payments as a Percentage of Payroll			-2.62%	

Note:
Budgeted contribution rates for FYE 2024 were known at the time of the June 30, 2023 Valuation. Amortization bases established at this valuation date were adjusted accordingly.

SECTION 5

MEMBERSHIP INFORMATION

Membership Tables

Summary of Membership Data

(Total dollar amounts expressed in thousands)

			June 30, 2023 (1)	June 30, 2022 (4)
1.	Active members			
	a.	Males	841	820
	b.	Females	27	24
	c.	Total members	868	844
	d.	Total annualized prior year salaries	$ 65,913	$ 47,885
	e.	Average salary[2]	$ 75,937	$ 56,736
	f.	Average age	36.9	36.5
	g.	Average service	10.5	10.1
	h.	Member contributions with interest	$ 47,394	$ 42,027
	i.	Average contributions with interest[2]	$ 54,601	$ 49,795
2.	Vested inactive members[1]			
	a.	Number	324	318
	b.	Total annual deferred benefits	$ 1,121	$ 1,120
	c.	Average annual deferred benefit[2]	$ 3,460	$ 3,522
	d.	Average age at the valuation date	45.0	44.6
3.	Nonvested inactive members[1]			
	a.	Number	390	349
	b.	Total member contributions with interest	$ 521	$ 474
	c.	Average contributions with interest[2]	$ 1,336	$ 1,358
4.	Service retirees			
	a.	Number	1,385	1,397
	b.	Total annual benefits	$ 55,037	$ 55,549
	c.	Average annual benefit[2]	$ 39,738	$ 39,763
	d.	Average age at the valuation date	64.4	63.7
5.	Disabled retirees			
	a.	Number	54	55
	b.	Total annual benefits	$ 905	$ 929
	c.	Average annual benefit[2]	$ 16,759	$ 16,891
	d.	Average age at the valuation date	58.3	57.6
6.	Beneficiaries			
	a.	Number	258	250
	b.	Total annual benefits	$ 7,352	$ 7,302
	c.	Average annual benefit[2]	$ 28,496	$ 29,208
	d.	Average age at the valuation date	68.1	68.1

[1] Vested inactive member section includes Tier 1 members eligible for a benefit equal to the actuarially equivalent of two times the member's contribution balance.

2 Average dollar amounts shown are expressed to the dollar.

Summary of Historical Active Membership

June 30,	Active Members: Number	Active Members: Percent Increase /(Decrease)	Covered Payroll[1]: Amount in Thousands	Covered Payroll[1]: Percent Increase /(Decrease)	Average Annual Pay: Amount	Average Annual Pay: Percent Increase /(Decrease)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2014	855		$ 44,616		$ 52,182	
2015	937	9.6%	45,765	2.6%	48,842	-6.4%
2016	908	-3.1%	45,551	-0.5%	50,167	2.7%
2017	903	-0.6%	48,598	6.7%	53,819	7.3%
2018	886	-1.9%	48,808	0.4%	55,088	2.4%
2019	883	-0.3%	47,752	-2.2%	54,079	-1.8%
2020	798	-9.6%	46,145	-3.4%	57,826	6.9%
2021	775	-2.9%	45,338	-1.7%	58,501	1.2%
2022	844	8.9%	47,885	5.6%	56,736	-3.0%
2023	868	2.8%	65,913	37.6%	75,937	33.8%

[1] Covered payroll is the annualized, projected compensation for the following year and does not include payroll attributable to working retirees.

Distribution of Active Members by Age and by Years of Service

SPRS Members

Attained Age	0 Count & Avg. Comp.	1 Count & Avg. Comp.	2 Count & Avg. Comp.	3 Count & Avg. Comp.	4 Count & Avg. Comp.	5-9 Count & Avg. Comp.	10-14 Count & Avg. Comp.	15-19 Count & Avg. Comp.	20-24 Count & Avg. Comp.	25-29 Count & Avg. Comp.	30-34 Count & Avg. Comp.	35 & Over Count & Avg. Comp.	Total Count & Avg. Comp.
	Years of Credited Service												
Under 20	0	0	0	0	0	0	0	0	0	0	0	0	0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
20-24	29	40	9	0	0	0	0	0	0	0	0	0	78
	$33,406	$58,522	$63,251	$0	$0	$0	$0	$0	$0	$0	$0	$0	$49,730
25-29	15	47	24	3	38	20	0	0	0	0	0	0	147
	$34,489	$60,439	$64,280	$64,923	$67,883	$69,129	$0	$0	$0	$0	$0	$0	$61,616
30-34	6	13	4	5	16	77	20	0	0	0	0	0	141
	$35,519	$61,553	$60,390	$62,812	$67,415	$71,909	$75,049	$0	$0	$0	$0	$0	$68,692
35-39	1	6	1	1	5	46	82	10	0	0	0	0	152
	$42,289	$59,109	$61,559	$61,632	$66,607	$73,685	$77,041	$87,184	$0	$0	$0	$0	$75,209
40-44	2	1	0	0	4	14	48	71	18	2	0	0	160
	$47,452	$61,787	$0	$0	$67,638	$73,422	$77,119	$93,231	$99,741	$123,990	$0	$0	$86,372
45-49	0	0	0	1	0	6	19	33	44	5	1	0	109
	$0	$0	$0	$63,250	$0	$71,619	$77,020	$90,889	$99,664	$109,297	$112,923	$0	$91,746
50-54	0	0	0	0	1	3	7	15	17	11	2	0	56
	$0	$0	$0	$0	$68,029	$89,897	$80,222	$87,093	$102,950	$111,002	$153,962	$0	$97,942
55-59	0	0	0	0	0	0	1	6	6	6	2	0	21
	$0	$0	$0	$0	$0	$0	$70,286	$93,760	$104,159	$118,885	$121,053	$0	$105,391
60-64	0	0	0	0	0	0	0	2	1	1	0	0	4
	$0	$0	$0	$0	$0	$0	$0	$76,506	$85,633	$102,579	$0	$0	$85,306
65 & Over	0	0	0	0	0	0	0	0	0	0	0	0	0
	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total	53	107	38	10	64	166	177	137	86	25	5	0	868
	$34,649	$59,796	$63,555	$63,371	$67,653	$72,508	$76,922	$91,332	$100,480	$113,255	$132,590	$0	$75,937

Distribution of Annuitant Monthly Benefit by Status and Age
Retirees and Beneficiaries
(Dollar amounts expressed in thousands)

	Retirement		Disability		Survivors & Beneficiaries		Total	
Current Age	Number of Annuitants	Total Annual Benefit Amount	Number of Annuitants	Total Annual Benefit Amount	Number of Annuitants	Total Annual Benefit Amount	Number of Annuitants	Total Annual Benefit Amount
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Under 50	131	$ 4,783	14	$ 239	34	$ 510	179	$ 5,532
50 - 54	224	9,030	11	216	14	284	249	9,530
55 - 59	186	7,300	5	80	12	232	203	7,612
60 - 64	170	7,004	6	94	16	341	192	7,440
65 - 69	166	6,895	8	113	27	796	201	7,803
70 - 74	251	10,061	5	72	47	1,492	303	11,625
75 - 79	149	6,213	3	65	53	1,747	205	8,025
80 - 84	77	2,606	2	25	23	777	102	3,408
85 - 89	21	706	0	0	20	717	41	1,423
90 And Over	10	441	0	0	12	455	22	896
Total	**1,385**	**$ 55,037**	**54**	**$ 905**	**258**	**$ 7,352**	**1,697**	**$ 63,294**

*Amounts may not add due to rounding

Retired Lives Summary

Form of Payment	Male Lives			Female Lives			Total		
	Number		Monthly Benefit Amount	Number		Monthly Benefit Amount	Number		Monthly Benefit Amount
(1)	(2)		(3)	(4)		(5)	(6)		(7)
Basic	158	$	476,472	17	$	42,925	175	$	519,397
Joint & Survivor:									
100% to Beneficiary	182		534,668	2		9,093	184		543,761
66 2/3% to Beneficiary	94		344,155	2		7,542	96		351,697
50% to Beneficiary	76		272,750	2		7,515	78		280,265
Pop-up Option	674		2,368,933	6		11,214	680		2,380,147
Social Security Option:									
Age 62 Basic	24		61,303	0		0	24		61,303
Age 62 Survivorship	93		175,182	1		4,416	94		179,597
Partial Deferred (Old Plan)	0		0	0		0	0		0
Widows Age 60	0		0	0		0	0		0
5 Years Certain	0		0	0		0	0		0
10 Years Certain	10		35,046	0		0	10		35,046
10 Years Certain & Life	36		118,422	3		6,759	39		125,181
15 Years Certain & Life	17		46,210	2		9,579	19		55,789
20 Years Certain & Life	38		125,665	2		3,979	40		129,644
Total:	1,402	$	4,558,806	37	$	103,021	1,439	$	4,661,827

Beneficiary Lives Summary

	Male Lives			Female Lives			Total		
Form of Payment	Number		Monthly Benefit Amount	Number		Monthly Benefit Amount	Number		Monthly Benefit Amount
(1)	(2)		(3)	(4)		(5)	(6)		(7)
Basic	2	$	820	8	$	10,995	10	$	11,815
Joint & Survivor:									
100% to Beneficiary	8		12,812	60		165,210	68		178,022
66 2/3% to Beneficiary	3		1,678	22		53,853	25		55,530
50% to Beneficiary	2		2,249	22		34,331	24		36,580
Pop-up Option	1		365	65		195,041	66		195,406
Social Security Option:									
Age 62 Basic	0		0	3		3,103	3		3,103
Age 62 Survivorship	2		934	50		101,754	52		102,688
Partial Deferred (Old Plan)	0		0	0		0	0		0
Widows Age 60	0		0	0		0	0		0
5 Years Certain	0		0	0		0	0		0
10 Years Certain	1		2,038	2		14,018	3		16,056
10 Years Certain & Life	0		0	0		0	0		0
15 Years Certain & Life	0		0	1		721	1		721
20 Years Certain & Life	1		6,686	5		6,092	6		12,777
Total:	20	$	27,583	238	$	585,118	258	$	612,701

Schedule of Retirees Added to And Removed from Rolls

(Dollar amounts except average allowance expressed in thousands)

Year Ended	Added to Rolls Number	Removed from Rolls Number	Rolls End of the Year Number	Rolls End of the Year Annual Benefits	% Increase in Annual Benefit	Average Annual Benefit
(1)	(2)	(3)	(4)	(5)	(6)	(7)
2014	95	28	1,413	$ 53,432		$ 37,815
2015	62	15	1,460	54,930	2.8%	37,624
2016	65	10	1,515	56,650	3.1%	37,393
2017	30	9	1,536	57,253	1.1%	37,274
2018	81	17	1,600	59,626	4.1%	37,266
2019	74	27	1,647	61,404	3.0%	37,282
2020	61	39	1,669	62,432	1.7%	37,407
2021	55	51	1,673	62,700	0.4%	37,477
2022	76	47	1,702	63,780	1.7%	37,473
2023	43	48	1,697	63,294	-0.8%	37,298

SECTION 6

ASSESSMENT AND DISCLOSURE OF RISK

Risks Associated with Measuring the Accrued Liability And Actuarially Determined Contribution

(As Required by ASOP No. 51)

The determination of SPRS's accrued liability and actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. The risk measures illustrated in this section are intended to aid stakeholders in understanding the effects of future experience differing from the assumptions used in performing an actuarial valuation. These risk measures may also help with illustrating the potential volatility in the funded status and actuarially determined contributions that result from differences between actual experience and the expected experience based on the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience (economic and demographic) differing from the assumptions, changes in assumptions due to changing conditions, changes in contribution requirements due to modifications to the funding policy, and changes in the liability and cost due to changes in plan provisions or applicable law. The scope of this actuarial valuation does not include any analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the System's future financial condition include:

- Investment risk – actual investment returns may differ from expected returns;
- Longevity risk – members may live longer or shorter than expected and receive pensions for a time period different than assumed;
- Other demographic risks – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future contributions differing from expected;
- Salary and payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liabilities or contributions differing from expected;
- Asset/Liability mismatch – changes in assets may be inconsistent with changes in liabilities, thereby altering the relative difference between the assets and liabilities which may alter the funded status and contribution requirements;
- Contribution risk – actual contributions may differ from expected future contributions (for example, actual contributions not being paid in accordance with the System's funding policy, withdrawal liability assessments or other anticipated payments to the plan are not being paid, or material changes occurring in the anticipated number of covered employees, covered payroll, or another relevant contribution base).

Effects of certain experience can generally be anticipated. For example, if investment returns since the most recent actuarial valuation are less (or more) than the assumed rate of return, then the funded status of the plan can be expected to decrease (or increase) more than anticipated.

The required contributions in this report were established in accordance with applicable Statutes and assumptions adopted by the Board. However, stakeholders should be aware that the scheduled contributions specified in State Code do not necessarily guarantee that the contribution requirements will not increase in a future year.

Employer Risk with Contribution Rates

Currently contributions are collected from the Commonwealth based on the total payroll of employees who are earning benefits in SPRS (i.e. covered payroll). The actuarially determined contribution rate is comprised of two components - the normal cost rate (to pay for the benefits accruing in the next year) and the unfunded amortization (to pay for the benefits accrued by members in previous years). The unfunded amortization is calculated by first determining the dollar amount necessary to pay for the unfunded liability based on SPRS's funding policy, and then by dividing that dollar amount by expected covered payroll to convert that contribution requirement to a percentage of payroll (i.e. a contribution rate).

As the contribution requirement, as a percentage of payroll, increases then there is increased incentive for participating employers to make deliberate business action to reduce their payroll reported to the System in order to reduce their pension cost.

Plan Specific Risk Measures

Risks faced by a pension plan evolve over time. A relatively new plan with virtually no assets and paying few benefits will experience lower investment risk than a mature plan with a significant amount of assets and large number of members receiving benefits. There are a few measures that can assist stakeholders in understanding and comparing the maturity of a plan to other systems, which include:

- <u>Ratio of market value of assets to payroll</u>: The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. If assets are approximately the same as covered payroll, an investment return that is 5% different than assumed would equal 5% of payroll. In another example, if the assets are approximately twice as large as covered payroll, an investment return that is 5% different than assumed would equal 10% of payroll. A ratio that increases over time generally indicates the potential of an increasing volatility in employer contribution rates as a percentage of payroll.
- <u>Ratio of actuarial accrued liability to payroll</u>: The ratio of actuarial accrued liability to payroll can be used as a measure to indicate the potential volatility of contributions due to volatility in the liability experience. For instance, if the actuarial accrued liability is 5 times the size of the covered payroll, then a change in the liability that is 2% different than expected would be a change in magnitude that is 10% of payroll. A ratio that increases over time generally indicates the potential of an increasing volatility in employer contribution rates as a percentage of payroll.
- <u>Percentage of Expected Contributions Actually Received</u>: This measure identifies the percentage difference between the contributions the fund expects to receive during the fiscal year to and actual contributions received by the fund during the fiscal year. A percentage that is less than 100% means that actual contributions the fund received were less than the expected contributions determined by a prior actuarial valuation. On the other hand, a percentage that is greater than 100% means that actual contributions the fund received were more than the expected contributions.

- Ratio of active to retired members: A relatively mature open plan is likely to have close to the same number of actives to retirees resulting in a ratio that is around 1.0. On the other hand, a super-mature plan, or a plan that is closed to new entrants will have more retirees than active members resulting in a ratio below 1.0. As this ratio declines, a larger portion of the total actuarial accrued liability in the System is attributable to retirees. This metric also typically moves in tandem with the liability to payroll metric, which provides an indication of potential contribution volatility.

The following tables provide a summary of these measures for SPRS for the current year and the prior four years so stakeholders can identify how these measures are trending. While ASOP No. 51 requires this disclosure with respect to only the retirement fund, we have included this information for the insurance fund for completeness.

SPRS

	Retirement Fund					Insurance Fund				
	June 30,					June 30,				
	2023	2022	2021	2020	2019	2023	2022	2021	2020	2019
Ratio of the market value of assets to total payroll	8.97	11.52	7.86	6.37	5.99	3.76	4.83	5.45	4.36	4.21
Ratio of actuarial accrued liability to payroll	16.56	22.29	23.23	22.82	21.89	3.70	4.86	6.01	5.98	5.80
Ratio of net cash flow to market value of assets	-0.2%	47.9%	0.2%	0.5%	1.4%	-1.9%	-2.2%	-1.9%	-0.5%	-0.2%
Percentage of Expected Contribution Actually Received	142% [1]	107%	104%	103%	101%	137% [1]	107%	102%	101%	100%
Ratio of actives to retirees and beneficiaries	0.51	0.50	0.46	0.48	0.54					

[1] Expected contribution for FYE2023 based on the actuarially determined contribution rate of 99.43% from the June 30, 2021 valuation and expected compensation based on census data from the June 30, 2022 valuation.

Low-Default-Risk Obligation Measure

Introduction

In December 2021, the Actuarial Standards Board (ASB) adopted a revision to Actuarial Standard of Practice (ASOP) No. 4, Measuring Pension Obligations and Determining Pension Plan Costs or Contributions. The revised ASOP No. 4 requires the calculation and disclosure of a liability referred to by the ASOP as the "Low-Default-Risk Obligation Measure" (LDROM). The rationale that the ASB cited for the calculation and disclosure of the LDROM was included in the Transmittal Memorandum of ASOP No. 4 and is presented below (emphasis added):

> "The ASB believes that the calculation and disclosure of this measure provides **appropriate, useful information for the intended user regarding the funded status of a pension plan.** The calculation and disclosure of this additional measure is **not intended to suggest that this is the "right" liability measure** for a pension plan. However, the ASB does believe that **this additional disclosure provides a more complete assessment of a plan's funded status and provides additional information regarding the security of benefits that members have earned as of the measurement date."**

Comparing the Accrued Liabilities and the LDROM

One of the fundamental financial objectives of the State Police Retirement System (SPRS) is to finance each member's retirement benefits over the period from the member's date of hire until the member's projected date of retirement (entry age actuarial cost method) as a level percentage of payroll. To fulfill this objective, the discount rate that is used to value the accrued liabilities of SPRS is set equal to the **expected return** on each fund's diversified portfolio of assets (referred to sometimes as the investment return assumption). For the retirement fund, the investment return assumption is 5.25%.

The LDROM is meant to approximately represent the lump sum cost to a plan to purchase low-default-risk fixed income securities whose resulting cash flows essentially replicate in timing and amount the benefits earned (or the costs accrued) as of the measurement date. The LDROM is very dependent upon market interest rates at the time of the LDROM measurement. The lower the market interest rates, the higher the LDROM, and vice versa. The LDROM results presented in this report are based on the entry age actuarial cost method and discount rates based upon the intermediate rate from the FTSE Pension Discount Curve and Liability Index published by the Society of Actuaries. This rate is 4.90% as of June 30, 2023. This measure may not be appropriate for assessing the need for or amount of future contributions. This measure may not be appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligation.

The difference between the two measures (Valuation and LDROM) is one illustration of the savings the sponsor anticipates by taking on risk in a diversified portfolio.

Retirement Fund

Valuation Accrued Liabilities	LDROM
$1,091,794,728	$1,137,046,120

APPENDIX A

ACTUARIAL ASSUMPTIONS AND METHODS

Summary of Actuarial Methods and Assumptions

The following presents a summary of the actuarial assumptions and methods used in the valuation of the State Police Retirement System.

In general, the assumptions and methods used in the valuation are based on the actuarial experience study as of June 30, 2022 and adopted by the Board in June 2023.

Investment return rate:

Assumed annual rate of 5.25% net of investment expenses for the retirement fund

Assumed annual rate of 6.50% net of investment expenses for the insurance fund

Price Inflation:

Assumed annual rate of 2.50%

Payroll Growth Assumption (used for amortization of unfunded accrued liabilities):

Assumed annual rate of 0.00%

Rates of Annual Salary Increase:

Assumed rates of annual salary increases are shown below.

Service Years	Annual Rates of Salary Increases		
	Merit & Seniority	Price Inflation & Productivity	Total Increase
0	12.50%	3.55%	16.05%
1	5.00%	3.55%	8.55%
2	4.00%	3.55%	7.55%
3	2.00%	3.55%	5.55%
4	2.00%	3.55%	5.55%
5	2.00%	3.55%	5.55%
6	2.00%	3.55%	5.55%
7	1.00%	3.55%	4.55%
8	1.00%	3.55%	4.55%
9	0.00%	3.55%	3.55%
10 & Over	0.00%	3.55%	3.55%

Retirement rates:

Assumed annual rates of retirement are shown below. Rates are only applicable for members who are eligible for a service retirement.

Service	Members participating Before 9/1/2008[1]	Members participating on or after 9/1/2008[2]	Members participating after 1/1/2014[2]
20	22.0%		
21	22.0%		
22	22.0%		
23	28.0%		
24	28.0%		
25	28.0%	17.6%	16.0%
26	28.0%	17.6%	16.0%
27	28.0%	17.6%	16.0%
28	44.0%	22.4%	16.0%
29	44.0%	22.4%	16.0%
30	44.0%	22.4%	100.0%
31	58.0%	22.4%	
32	58.0%	22.4%	
33	58.0%	35.2%	
34	58.0%	35.2%	
35	58.0%	35.2%	
36	58.0%	46.4%	
37	58.0%	46.4%	
38	58.0%	46.4%	
39	58.0%	46.4%	
40+	58.0%	46.4%	

[1] *The annual rate of service retirement is 100% at age 55.*

[2] *The annual rate of service retirement is 100% at age 60.*

For members hired after 7/1/2003 and prior to 9/1/2008, the rates shown above are multiplied by 80% if the member is under the age of 55 to reflect the different retiree health insurance benefit.

Disability rates:

An abbreviated table with assumed rates of disability is show below.

Age	Annual Rates of Disability	
	Male	Female
20	0.05%	0.05%
30	0.09%	0.09%
40	0.20%	0.20%
50	0.56%	0.56%
60	1.46%	1.46%

Withdrawal rates (for causes other than disability and retirement):

Assumed annual rates of withdrawal are shown below and include pre-retirement mortality rates as described on the next page.

Service	Annual Rates of Withdrawal
1	15.00%
2	5.30%
3	4.14%
4	3.47%
5	2.98%
6	2.61%
7	2.30%
8	2.05%
9	1.83%
10	1.63%
11	1.45%
12	1.29%
13	1.14%
14	1.01%
15	0.88%
16	0.77%
17	0.66%
18	0.56%
19	0.46%
20	0.37%
21 & Over	0.00%

Mortality Assumption:

Pre-retirement mortality: PUB-2010 Public Safety Mortality, projected with the ultimate rates from the MP-2020 mortality improvement scale using a base year of 2010.

Post-retirement mortality (non-disabled): System-specific mortality table based on mortality experience from 2013-2022, projected with the ultimate rates from the MP-2020 mortality improvement scale using a base year of 2023.

The following table provides the life expectancy for a non-disabled retiree in future years based on the assumption with full generational projection:

Life Expectancy for an Age 65 Retiree in Years					
Gender	**Year of Retirement**				
	2025	**2030**	**2035**	**2040**	**2045**
Male	19.8	20.2	20.6	21.0	21.3
Female	22.4	22.7	23.1	23.4	23.7

Post-retirement mortality (disabled): PUB-2010 Disabled Mortality table, with rates multiplied by 150% for both male and female rates, projected with the ultimate rates from the MP-2020 mortality improvement scale using a base year of 2010.

Marital status:

100% of employees are assumed to be married, with the female spouse 3 years younger than the male spouse.

Line of Duty Disability

70% of disabilities are assumed to occur in the line of duty (10% of which are assumed to be "total and permanent")

Line of Duty Death

25% of deaths are assumed to occur in the line of duty

Dependent Children:

For members who receive a duty-related death or disability benefit, the member is assumed to be survived by two dependent children, each age 6 with payments for 15 years.

Form of Payment:

Members are assumed to elect a life-only annuity at retirement.

Actuarial Cost Method:

Entry Age Normal, Level Percentage of Pay. The Entry Age Normal actuarial cost method allocates the System's actuarial present value of future benefits to various periods based upon service. The portion of the present value of future benefits allocated to years of service prior to the valuation date is the actuarial accrued liability, and the portion allocated to years following the valuation date is the present value of future normal costs. The normal cost is determined for each active member as the level percent of pay necessary to fully fund the expected benefits to be earned over the career of each individual active member. The normal cost is partially funded with active member contributions with the remainder funded by employer contributions.

Health Care Age Related Morbidity/Claims Utilization:

To model the impact of aging on the underlying health care costs for Medicare retirees, the valuation relied on the Society of Actuaries' 2013 Study "Health Care Costs – From Birth to Death". Table 4 (Development of Plan Specific Medicare Age Curve) was used to model the impact of aging for ages 65 and over.

Health Care Cost Trend Rates:

Year	Non-Medicare Plans[1]	Medicare Plans[1]	Dollar Contribution[2]
2025	6.80%	8.50%	1.50%
2026	6.55%	8.00%	1.50%
2027	6.30%	8.00%	1.50%
2028	6.05%	8.00%	1.50%
2029	5.80%	7.50%	1.50%
2030	5.55%	7.00%	1.50%
2031	5.30%	6.50%	1.50%
2032	5.05%	6.00%	1.50%
2033	4.90%	5.50%	1.50%
2034	4.75%	5.00%	1.50%
2035	4.60%	4.50%	1.50%
2036	4.45%	4.05%	1.50%
2037	4.30%	4.05%	1.50%
2038 & Beyond	4.05%	4.05%	1.50%

[1]All increases are assumed to occur on January 1. The 2024 premiums were known at the time of the valuation and were incorporated into the liability measurement
[2]Applies to members participating on or after July 1, 2003. All increases are assumed to occur on July 1.

Health care trend assumptions are based on the model issued by the Society of Actuaries "Getzen model of Long-Run Medical Cost Trends for the SOA; Thomas E. Getzen, iHEA and Temple University 2014 © Society of Actuaries.

The underlying assumptions used to develop the health care trend rates include:

- A short run period-this is a period for which anticipated health care trend rates are manually set based on local information as well as plan-specific and carrier information.
- Long term real GDP growth – 1.75%
- Long term rate of inflation – 2.30%
- Long term nominal GDP growth – 4.05%
- Year that excess rate converges to 0 – 2036

Health care trend rates are thus the manually set rates for the short run period and rates which decline to an ultimate trend rate which equals the assumed nominal long-term GDP growth rate.

Health Care Participation Assumptions:

- Active members are assumed to elect health coverage at retirement at the following participation rates.

Service at Retirement	Members participating before 7/1/2003*	Members participating after 7/1/2003
Under 10	100%	100%
10-14	100%	100%
15-19	100%	100%
Over 20	100%	100%

* 100% of members with a duty disability or a duty death (in service) benefit are assumed to elect coverage at retirement.

- Future retirees are assumed to have a similar distribution by plan type as the current retirees.

Medicare Plan	Participation Percentage
Medical Only[1]	5%
Essential Plan	8%
Premium Plan	87%

Non-Medicare Plan	Participation Percentage
LivingWell Basic	4%
LivingWell CDHP	35%
LivingWell PPO	61%

[1] Includes Mirror Plans

- 100% of deferred vested members participating are assumed to elect health coverage at retirement.

- Deferred vested members are assumed to begin health coverage at age 50 for members participating before January 1, 2014 and at age 60 for members participating on or after January 1, 2014.

- 85% of future retirees, with hazardous service, are assumed to elect spouse health care coverage. 100% of spouses with health care coverage are assumed to continue coverage after the member's death.

Other Assumptions

1. Valuation payroll (used for determining the amortization contribution rate): Current fiscal year payroll.

2. Individual salaries used to project benefits: For salary amounts prior to the valuation date, the salary from the last fiscal year is projected backward with the valuation salary scale assumption. For future salaries, the salary from the last fiscal year is projected forward with one year's salary scale.

3. Pay increase timing: Beginning of (fiscal) year. This is equivalent to assuming that reported salaries represent amounts paid to members during the year ending on the valuation date.

4. Current active members that terminated employment (for reasons other than retirement, disability, or death) are assumed to commence their retirement benefits at first unreduced retirement eligibility. Members are assumed to elect a refund of member contributions if the value of their account balance exceeds the present value of the deferred benefit. Members participating in the Cash Balance plan are assumed to elect to receive a lump sum of their cash balance account if their account balance exceeds the present value of the deferred benefit and the member is not eligible for insurance benefits at termination.

5. The beneficiaries of current active members that die while active are assumed to commence their survivor benefits at the member's first unreduced retirement eligibility. Beneficiaries are assumed to elect a refund of member contributions if the value of the member's account balance exceeds the present value of the survivor benefit. Beneficiaries of active members that die while in the line of duty are assumed to commence their survivor benefits immediately at the death of the member.

6. There will be no recoveries once disabled.

7. Cash Balance Provisions: The cash balance interest crediting rate while a member is an active employee is assumed to equal 5.90%. The interest crediting rate after a member terminates employment is 4%.

8. Cash Balance Credit for Unused Sick Leave (annual and at retirement): It is assumed Tier 3 members will receive an additional 7.5% of pay employer pay credit each year due to the conversion of unused sick leave after the member attains five years of service. It is also assumed the Tier 3 members will have fund 480 hours of unused sick leave to convert to pay credit at the time of their retirement. It is assumed that the General Assembly will fund this benefit in all future years.

9. Decrement timing: Decrements of all types are assumed to occur mid-year. Decrement rates are used as described in this report, without adjustment for multiple decrement table effects.

10. Service: All members are assumed to accrue 1 year of benefit and eligibility service each year.

11. Eligibility testing: Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

12. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.

13. Current Inactive Population (Retirement Fund): All non-vested members are assumed to take an immediate refund of member contributions. Vested members are assumed to elect an immediate refund of member contributions at the valuation date if the value of their account balance exceeds the present value of their deferred benefit. Members hired prior to September 1, 2008 are assumed to retire at age 55 and members hired on or after September 1, 2008 are assumed to retire at age 60.

14. The additional $5 per year of service insurance dollar subsidy effective January 1, 2023 is assumed to be paid in all applicable years.

Participant Data

Participant data was supplied in electronic text files. There were separate files for (i) active and inactive members, and (ii) members and beneficiaries receiving benefits.

The data for active and terminated members included date of birth, gender, date of participation, benefit tier indicator, service with the current system, total vesting service, salary, employee contribution account balances, and employer pay credits for members participating in the cash balance plan. For retired members and beneficiaries, the data included date of birth, gender, spouse's date of birth (where applicable), amount of monthly benefit, date of retirement, and form of payment code.

Assumptions were made to correct for missing, bad, or inconsistent data. These had no material impact on the results presented.

Changes in assumptions since the prior valuation:

Demographic and economic assumptions were updated based on the 2022 Experience Study.

In conjunction with the review of the healthcare per capita claims cost, the assumed increase in future healthcare costs, or trend assumption, is reviewed on an annual basis. The trend assumption was increased during the select period in this valuation as a result of our review.

Development of Baseline Claims Cost

For non-Medicare retirees, the initial per capita costs were based on the plan premiums effective January 1, 2024, and are used for both current and future retirees. An inherent assumption in this methodology is that the projected future retirees will have a similar distribution by plan type as the current retirees. The spouse/dependent premium of $1,129.72 for non-Medicare retirees is based on a blending of Family and Couple premiums for the current retirees that have over 4 years of hazardous service. The fully-insured premiums paid to the Kentucky Employees' Health Plan (KEHP) are blended rates based on the combined experience of active and retired members. Because the average cost of providing health care benefits to retirees under age 65 is higher than the average cost of providing health care benefits to active employees, there is an implicit rate subsidy for the non-Medicare eligible retirees. Actuarial Standard of Practice No. 6 (ASOP No. 6) requires aging subsidies (or implicit rate subsidies) to be recognized. However, the health insurance trusts are only used to reimburse KEHP for the employer's portion of the blended premiums. Said another way, the trusts are not used to fund the difference between the underlying retiree claims and the blended KEHP premiums. As a result, the retiree health care liabilities developed in this report for the non-Medicare retirees are based solely on the premiums charged by KEHP, without any age-adjustment. GASB Statements No. 74 and No. 75 prohibit such a deviation from ASOP No. 6. The liabilities developed in this report are solely for the purpose of funding the benefits paid by the health insurance funds and are not appropriate for financial statement disclosures required by GASB. GRS provides separate GASB reports which include the liabilities associated with the implicit rate subsidy.

2024 Monthly Costs for those not eligible for Medicare		
Age	Member	Spouse/Dependents
<65	$929.46	$1,129.72

For Medicare retirees, the initial per capita costs were estimated based on the plan premiums effective January 1, 2024, and are used for both current and future retirees. An inherent assumption in this methodology is that the projected future retirees will have a similar distribution by plan type as the current retirees. Age graded and sex distinct premiums are utilized for retirees over the age of 65. These costs are appropriate for the unique age and sex distribution currently existing. Over the future years covered by this valuation, the age and sex distribution will most likely change. Therefore, our process "distributes" the average premium over all age/sex combinations and assigns a unique premium for each combination. The age/sex specific costs more accurately reflect the health care utilization and cost at that age.

2024 Monthly Costs for those eligible for Medicare		
Age	Male	Female
65	$ 81.35	$ 76.72
75	95.18	92.87
85	100.65	101.83

Appendix B of the report provides a full schedule of premiums.

The percentage of the insurance premium paid by SPRS is calculated based on the Medical Only premium amounts. The majority of SPRS Medicare retirees are covered under the Premium Medicare Advantage plan. Because the premiums for the Medical Only plan are higher than the Premium Medical Advantage plan, retirees with less than 20 years of service pay a smaller contribution toward their insurance coverage. To model the impact of the employer contribution being based on the Medical Only Plan rather than the plan selected by the retiree, the employer share for retirees qualifying for percentage-based subsidies was blended to reflect retiree plan selection.

The above assumption implicitly implies that the Medical Only plan premiums will increase at a rate of 4.90% as of January 1, 2024, decreasing over 9 years to an ultimate trend rate of 4.05%, and that the remaining Medicare plan premiums will increase at the Medicare trend assumption used in the actuarial valuation.

Blake Orth is a Member of the American Academy of Actuaries (MAAA) and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

Blake Orth

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Blake Orth, FSA, EA, MAAA

APPENDIX B

BENEFIT PROVISIONS

Summary of Benefit Provisions for State Police Retirement System (SPRS)

SPRS Employees

Retirement: Tier 1, Participation before 9/1/2008

Normal Retirement Eligibility	Age 55 with at least 1 month of service credit; or Any age with at least 20 years of service
Benefit Amount	If a member has at least 60 months of service, the monthly benefit is 2.50% times final average compensation times years of service. If a member has less than 60 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest. Final average compensation is based on the member's highest 3 years of compensation.
Early Retirement Eligibility	Age 50 with at least 15 years of service
Early Retirement Reduction	Normal Retirement benefit reduced 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member's retirement eligibility precedes the member's normal retirement date.

SPRS Employees (continued)

Retirement: Tier 2, Participation on or after 9/1/2008 but before 1/1/2014

Normal Retirement Eligibility — Age 60 with at least 5 years of service; or
Any age with at least 25 years of service

Benefit Amount — The monthly benefit is equal to the applicable benefit multiplier times final average compensation times years of service.

Years of Service	Benefit Multiplier
10 or less	1.30%
10-20	1.50%
20-25	2.25%
Greater than 25	2.50%

Final compensation is based on the member's highest 3 years of compensation.

Early Retirement Eligibility — Age 50 with at least 15 years of service

Early Retirement Reduction — Normal Retirement benefit reduced 6.5% per year for the first five years and 4.5% per year for the next five years for each year the member's retirement date precedes the member's normal retirement eligibility.

Retirement: Tier 3, Participation on or after 1/1/2014

Normal Retirement Eligibility — Age 60 with at least 5 years of service; or
Any age with at least 25 years of service

Benefit Amount — Each year that the member is active, a 7.50% employer pay credit and the employee's 8.00% contribution will be credited to each member's hypothetical cash balance account. The hypothetical account will earn interest at a minimum rate of 4%, annually. If the System's geometric average net investment return for the previous five years exceeds 4%, then the hypothetical account will be credited with an additional amount of interest in that year equal to 75% of the amount of the return which exceeds 4%. All interest credits will be applied to the hypothetical account balance on June 30 based on the account balance as of June 30 of the previous year.

Each June 30 (beginning June 30, 2023), members with at least five years of service credit will receive an employer pay credit based on their unused sick leave in excess of 480 hours. Members will also receive an employer pay credit based on their balance of unused sick leave upon termination of employment.

At retirement, the member's hypothetical account balance may be converted into an annuity based on an actuarial factor.

Early Retirement Eligibility — N/A

SPRS Employees (continued)

Deferred Vested Benefit: Tier 1, Participation before 9/1/2008

Eligibility	At least 1 month of service credit
Benefit Amount	Normal retirement benefit deferred to normal retirement age, or a reduced retirement benefit at an early retirement age

Deferred Vested Benefit: Tier 2, Participation on or after 9/1/2008 but before 1/1/2014

Eligibility	5 years of service
Benefit Amount	Normal retirement benefit deferred to normal retirement age, or a reduced retirement benefit at an early retirement age

Deferred Vested Benefit Tier 3, Participation on or after 1/1/2014

Eligibility	5 years of service
Benefit Amount	At termination of employment, members may choose to leave their account balance with the System and retire once they are eligible. The hypothetical account balance will earn 4% annual interest after termination. Members may also choose to withdrawal their entire accumulated balance. If a member does not have 5 years of service at termination, the member is eligible to receive a partial refund of their account balance. This refund includes the member's contributions with interest.

Disability Retirement: Participation before 8/1/2004

Eligibility	60 months of service (requirement is waived if line of duty disability)
Disability Benefit	Disability benefits are calculated in the same manner as the normal retirement benefit with years of service and final compensation being determined as of the date of disability, except that if the member has less than 20 years of service at disability, service credit shall be added to the person's total service beginning with the last date of paid employment and continuing to the member's 55th birthday, with total service not exceeding 20 years. Total service credit added shall not be greater than the member's actual service at disability.

SPRS Employees (continued)

Disability Retirement: Participation on or after 8/1/2004 but before 1/1/2014

Eligibility	60 months of service (requirement is waived if line of duty disability)
Disability Benefit	The higher of 25% of the member's final monthly rate of pay or the member's normal retirement benefit (without reduction for early retirement) with years and final compensation being determined as of the date of disability.

Disability Retirement: Participation on or after 1/1/2014

Eligibility	60 months of service (requirement is waived if line of duty disability)
Disability Benefit	The higher of 25% of the member's final monthly rate of pay or the member's retirement benefit calculated at the member's normal retirement date.

Line of Duty Disability Benefit

Disability Benefit	If the disability is a direct result of an act in the line of duty, the benefit shall not be less than 25% of the member's final monthly final rate of pay. If the disability is deemed to be Total and Permanent, then this benefit shall not be less than 75% of the member's monthly average pay.
Child Benefit	Additionally, each eligible dependent child will receive 10% of the member's monthly average pay up to a maximum of 40%. Member and dependent payment shall not exceed 100% of member's monthly average pay.

Pre-Retirement Death Benefit

Eligibility	Eligible for early or normal retirement; or Under age 55 with at least 60 months of service and actively working at the time of death; or At least 144 months of service, if no longer actively working
Spouse Benefit	The member's retirement benefit calculated in the same manner as if the member had retired on the day of the member's death and elected a 100% joint and survivor benefit. The benefit is actuarially reduced if the member dies prior to their normal retirement age.

SPRS Employees (continued)

Pre-Retirement Death Benefit (Death in the Line of Duty)

Eligibility	One month of service credit
Spouse Benefit	A $10,000 lump sum payment plus a monthly payment of 75% of the deceased member's final monthly average pay. Each dependent child will receive 10% of the final monthly average pay (not to exceed a total child benefit of 25% while the spouse is alive). A spouse may also elect the non-line of duty death benefit.
Non-Spouse Benefit	If the beneficiary is only one person who is a dependent receiving at least 50% of his or her support from the member, the beneficiary may elect a lump sum payment of $10,000.
Child Benefit	In the event there is no surviving spouse, the benefit is 50% of final monthly average pay for one child, 65% of final average pay for two children, or 75% of final average pay for three or more eligible children.

Post-Retirement Death Benefit

Eligibility	48 months of service, and in receipt of retirement benefits
Death Benefit	A $5,000 lump sum payment

Member Contributions

Tier 1, Participation before 9/1/2008	8% of creditable compensation. Members who do not receive a retirement benefit are entitled to a full refund of contributions with interest. The annual interest rate is set by the Board, not less than 2.0%.
Tier 2, Participation on or after 9/1/2008 but before 1/1/2014	8% of creditable compensation plus 1% of creditable compensation, which is deposited into the 401(h) account and is not refundable. Members who do not receive a retirement benefit are entitled to a refund of non-401(h) contributions with interest. The annual interest rate is 2.5%.
Tier 3, Participation after 1/1/2014	8% of creditable compensation plus 1% of creditable compensation, which is deposited into the 401(h) account and is not refundable. Members who do not receive a retirement benefit are entitled to a refund of non-401(h) contributions with interest.

Changes in Retirement Benefits since the Prior Valuation

House Bill 506 passed during the 2023 legislative session and reinstated the Partial Lump Sum Option Form of payment for members who retire on and after January 1, 2024, and adjusted the minimum required separation period before a retiree may become reemployed and continue to receive their retirement allowance to one month for all circumstances.

Summary of Main Retiree Insurance Benefit Provisions

Insurance: Participation began before 7/1/2003

Benefit Eligibility Recipient of a retirement allowance

Benefit Amount

Non-Hazardous Service	Percentage of Member Premium Paid by Retirement System	Hazardous Service	Percentage of Member & Dependent Premium Paid by Retirement System
Less than 4 years	0%	Less than 4 years	0%
4 – 9 years	25%	4 – 9 years	25%
10 – 14 years	50%	10 – 14 years	50%
15 – 19 years	75%	15 – 19 years	75%
20 or more years	100%	20 or more years	100%

The percentage paid by the retirement system is applied to the 'contribution' plan selected by the Board.

Duty Disability Retirement If disability was a result of injuries sustained while in the line of duty, the member receives 100% of the maximum contribution for the member and dependents.

Duty Death in Service If an active employee's death was a result of injuries sustained while in the line of duty, the member's spouse and children receive a fully subsidized health insurance benefit.

Non-Duty Death in Service If the surviving spouses is in receipt of a pension allowance, he or she is eligible for continued health coverage. The percentage of the premium paid for by the retirement system is based on the member's years of hazardous service at the time of death.

Surviving Spouse of a Retiree A surviving spouse of a retiree, who is in receipt of a pension allowance, will receive a premium subsidy based on the member's years of hazardous service.

Hazardous employees who retired prior to August 1, 1998 System's contribution for spouse and dependents is based on total service.

Insurance: Participation began on or after 7/1/2003

Benefit Eligibility	Recipient of a retirement allowance with at least 120 months of service at retirement (180 months if participation began on or after 9/1/2008)
Non-Hazardous Subsidy	Monthly contribution of $10 for each year of earned non-hazardous service. The monthly contribution is increased by 1.5% each July 1. As of July 1, 2023, the Non-Hazardous monthly contribution was $14.41/year of service. Upon the retiree's death, the surviving spouse may continue coverage (if in receipt of a retirement allowance) but will be 100% responsible for the premiums. Effective January 1, 2023, members will receive an insurance dollar contribution of $5 for every year of non-hazardous service a member attains over 27 years. This additional dollar contribution does not increase by 1.5% annually and is only payable for non-Medicare retirees. Also, it is only payable when the applicable insurance fund is at least 90% funded on an actuarial value of asset basis as of the last actuarial valuation.
Hazardous Subsidy	Monthly contribution of $15 for each year of earned hazardous service. The monthly contribution is increased by 1.5% each July 1. As of July 1, 2023, the hazardous monthly contribution was $21.62/year of service. Upon the retiree's death, the surviving spouse of a hazardous duty member will receive a monthly contribution of $10 ($14.41 as of July 1, 2023) for each year of hazardous service. Effective January 1, 2023, members will receive an insurance dollar contribution of $5 for every year of hazardous service a Tier 1 member attains over 20 years and a Tier 2 member attains over 25 years. This additional dollar contribution does not increase by 1.5% annually and is only payable for non-Medicare retirees. Also, it is only payable when the applicable insurance fund is at least 90% funded on an actuarial value of asset basis as of the last actuarial valuation.
Duty Disability Retirement	If disability was a result of injuries sustained while in the line of duty or was duty-related, the member receives a benefit based on at least 20 years of service. This benefit is provided to members in the Non-Hazardous and Hazardous plans alike. If the disability is deemed to be Total and Permanent, the insurance premium for the member, the member's spouse, and the member's dependent children shall also be paid in full by the System. For non-hazardous members to be eligible for this benefit, they must be working in a position that could be certified as a hazardous position.

Duty Death in Service

If an active employee's death was a result of injuries sustained while in the line of duty, the member's spouse and children receive a fully subsidized health insurance benefit.

Non-Duty Death in Service

If the surviving spouse is in receipt of a pension allowance, he or she is eligible for continued health coverage. The percentage of the premium paid for by the retirement system is based on the member's years of hazardous service at the time of death.

Monthly Health Plan Premiums – Effective January 1, 2024

	Non-Medicare Plan Options				
Plan Option	Single	Parent Plus	Couple	Family	Family X-Ref
LivingWell PPO	$949.04	$1,320.40	$1,981.62	$2,185.78	$1,126.28
LivingWell CDHP	930.76	1,269.28	1,866.24	2,078.08	1,068.66
LivingWell Basic	901.04	1,234.80	1,863.04	2,069.88	1,057.40

Medicare Plan Options	
Medical Only Plan	$188.73
Essential Mirror Plan	228.98
Premium Mirror Plan	328.11
Essential Medical Advantage Plan	4.07
Premium Medical Advantage Plan	93.35

Contribution plan selected by the Board was the LivingWell PPO plan option for non-Medicare retirees. Contribution plan selected by the Board was the Medical Only plan for the Medicare retirees.

Dollar Contribution Amount for Participation on or after 7/1/2003

Monthly contribution amounts per year of service as of July 1, 2023.

Non-Hazardous Service	Hazardous Service
$14.41	$21.62

Note: Non-Hazardous benefits are applicable to SPRS members with prior service in a Non-Hazardous System.

Changes in Health Insurance Benefits since the Prior Valuation

None.

APPENDIX C

GLOSSARY

Glossary

Actuarial Accrued Liability (AAL): That portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of Future Plan Benefits which is not provided for by future Normal Costs. It is equal to the Actuarial Present Value of Future Plan Benefits minus the actuarial present value of future Normal Costs.

Actuarial Assumptions: Assumptions as to future experience under the Fund. These include assumptions about the occurrence of future events affecting costs or liabilities, such as:

- mortality, withdrawal, disablement, and retirement;
- future increases in salary;
- future rates of investment earnings and future investment and administrative expenses;
- characteristics of members not specified in the data, such as marital status;
- characteristics of future members;
- future elections made by members; and
- other relevant items.

Actuarial Cost Method or ***Funding Method:*** A procedure for allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability. These items are used to determine the ADC.

Actuarial Gain or ***Actuarial 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. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., the fund's assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results that produce actuarial liabilities which are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.

Actuarially Equivalent: Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

a. adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)

b. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and

c. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of those benefit amounts which are expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future compensation and service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive, non-retired members either entitled to a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial valuation for a governmental retirement system typically also includes calculations that provide the financial information of the plan, such as the funded ratio, unfunded actuarial accrued liability and the ADC.

Actuarial Value of Assets or ***Valuation Assets:*** The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly actuaries use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.

Actuarially Determined: Values which have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Actuarially Determined Contribution (ADC): The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation. The ADC consists of the Employer Normal Cost and the Amortization Payment.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.

Amortization Payment: The portion of the pension plan contribution or ADC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Closed Amortization Period: A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Funding Period and Open Amortization Period.

Decrements: Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.

Defined Benefit Plan: A retirement plan that is not a Defined Contribution Plan. Typically a defined benefit plan is one in which benefits are defined by a formula applied to the member's compensation and/or years of service.

Defined Contribution Plan: A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, and the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.

Employer Normal Cost: The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

Experience Study: A periodic review and analysis of the actual experience of the Fund which may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.

Funded Ratio: The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

Funding Period or ***Amortization Period:*** The term "Funding Period" is used two ways. In the first sense, it is the period used in calculating the Amortization Payment as a component of the ADC. This funding period is specified in State statute. In the second sense, it is a calculated item: the number of years in the future that will theoretically be required to amortize (i.e., pay off or eliminate) the Unfunded Actuarial Accrued Liability, based on a statutory employer contribution rate, and assuming no future actuarial gains or losses.

GASB: Governmental Accounting Standards Board.

GASB 67 and ***GASB 68***: Governmental Accounting Standards Board Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting and reporting rules for public retirement systems and the employers that sponsor, participate in, or contribute to them. Statement No. 67 sets the accounting rules for the financial reporting of the retirement systems, while Statement No. 68 sets the rules for the employers that sponsor, participate in, or contribute to public retirement systems.

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. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits which are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated. Under the entry age normal cost method, the Normal Cost is intended to be the level cost (when expressed as a percentage of pay) needed to fund the benefits of a member from hire until ultimate termination, death, disability or retirement.

Open Amortization Period: An open amortization period is one which is used to determine the Amortization Payment but may not decrease by exactly one year in the subsequent year's actuarial valuation. For instance, if the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year.

Unfunded Actuarial Accrued Liability: The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or Actuarial Valuation Date: The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

GRS
P: 469.524.0000 | www.grsconsulting.com

December 5, 2023

Board of Trustees
Kentucky Retirement Systems
Perimeter Park West
1260 Louisville Road
Frankfort, KY 40601

Re: Sensitivity Analysis Based on Results of the June 30, 2023 Actuarial Valuation – SPRS

Dear Members of the Board:

Per Kentucky State Statute 61.670, we are providing this supplemental information regarding the sensitivity of the valuation results to changes in some of the economic assumptions. Specifically, the attached tables show the impact for the **State Police Retirement System (SPRS)** due to changes in the investment return assumption, the inflation rate assumption, and the payroll growth rate assumption.

Background

Investment Assumption

The investment return assumption is used to discount future expected benefit payments to the valuation date in order to determine the liabilities of the plans. The lower the investment return assumption, the less the benefit payments are discounted and the higher the valuation liability. The current investment return assumption is 5.25% for the retirement fund and 6.50% for the insurance fund. The sensitivity analysis shows the financial impact of a 1.00% increase and a 1.00% decrease in the investment return assumption. For purposes of this sensitivity analysis, the inflation assumption and payroll growth assumption remain unchanged from the valuation assumption.

Inflation Assumption

The inflation assumption underlies most of the other economic assumptions, including the investment return, salary increases, and payroll growth rate. This is a macroeconomic assumption and as such the same assumption is used in the valuation of each of the retirement systems. The current assumption is 2.50% for all funds. The sensitivity analysis shows the financial impact of a 0.25% increase and a 0.25% decrease in the inflation assumption. Note, the change in the inflation assumption results in a corresponding change in the investment return assumption, the individual salary increase assumption for projecting members' benefit amounts, the payroll growth rate assumption, and the healthcare trend assumption that is used in the valuation of the health insurance funds.

Payroll Growth Assumption

Participating employers of SPRS make contributions to the system as a percentage of covered payroll. Therefore, as payroll changes over time these amortization payments will also change. If actual covered payroll increases at a rate that is less than assumed, then the retirement system receives fewer contribution dollars than expected to finance the unfunded liability, which means the contribution rates in future years will be required to increase in order to finance the unfunded liability over the same time period. The current payroll growth assumption is 0.00% for both the retirement and insurance funds. The analysis shows the impact of a 1.00% increase and a 1.00% decrease in the payroll growth assumption.

Please note that the payroll growth assumption does not impact the valuation liabilities, unfunded liability, or funded status of the system. Rather, this assumption only impacts the amortization rate for financing the existing unfunded actuarial accrued liability and the actuarially determined employer contribution. For purposes of this analysis, the investment return assumption and the inflation assumption are held at their current valuation assumptions.

Certification

The information provided in this letter compliments the information provided in the June 30, 2023 actuarial valuation report. Please refer to the June 30, 2023 actuarial valuation report for additional discussion of the actuarial valuation, including the nature of actuarial calculations and more information related to participant data, economic and demographic assumptions, and benefit provisions.

Actual results can, and almost certainly will, differ as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rate, and funding periods. The actuarial calculations are intended to provide information for rational decision making. The purpose of this information is to provide stakeholders the financial sensitivity of the unfunded liability and contribution rates to changes in the inflation, assumed rate of return, and payroll growth assumption.

To the best of our knowledge, this report is complete and accurate and is in accordance with generally recognized actuarial practices and methods. Mr. White and Ms. Shaw are Enrolled Actuaries. All three of the undersigned are members of the American Academy of Actuaries and meet all of the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. In addition, all three are independent of KPPA and are experienced in performing valuations for large public retirement systems. This communication shall not be construed to provide tax advice, legal advice or investment advice.

Sincerely,

Gabriel, Roeder, Smith & Company

Daniel J. White, FSA, EA, MAAA
Senior Consultant

Janie Shaw, ASA, EA, MAAA
Consultant

Krysti Kiesel, ASA, MAAA
Senior Analyst and Actuary

Sensitivity Analysis - Discount Rate

(Dollar amounts expressed in thousands)

(1)	Decrease Discount Rate (2)	Valuation Results (3)	Increase Discount Rate (4)
Payroll Growth Rate	0.00%	0.00%	0.00%
Inflation Rate	2.50%	2.50%	2.50%
Discount Rate - Retirement	4.25%	5.25%	6.25%
Discount Rate - Insurance	5.50%	6.50%	7.50%
Retirement			
Actuarial Accrued Liability	$ 1,230,025	$ 1,091,795	$ 978,378
Actuarial Value of Assets	589,848	589,848	589,848
Unfunded Actuarial Accrued Liability	640,177	501,947	388,530
Funded Ratio	48.0%	54.0%	60.3%
Actuarially Determined Contribution Rate	85.29%	65.79%	49.21%
Insurance			
Actuarial Accrued Liability	$ 269,048	$ 244,059	$ 222,956
Actuarial Value of Assets	245,172	245,172	245,172
Unfunded Actuarial Accrued Liability	23,876	(1,113)	(22,216)
Funded Ratio	91.1%	100.5%	110.0%
Actuarially Determined Contribution Rate	7.27%	2.31%	0.00%
Combined			
Actuarial Accrued Liability	$ 1,499,073	$ 1,335,854	$ 1,201,334
Actuarial Value of Assets	835,020	835,020	835,020
Unfunded Actuarial Accrued Liability	664,053	500,834	366,314
Funded Ratio	55.7%	62.5%	69.5%
Actuarially Determined Contribution Rate	92.56%	68.10%	49.21%

Sensitivity Analysis - Inflation Rate

(Dollar amounts expressed in thousands)

	Decrease Inflation Rate	Valuation Results	Increase Inflation Rate
(1)	(2)	(3)	(4)
Payroll Growth Rate	-0.25%	0.00%	0.25%
Inflation Rate	2.25%	2.50%	2.75%
Discount Rate - Retirement	5.00%	5.25%	5.50%
Discount Rate - Insurance	6.25%	6.50%	6.75%
Retirement			
Actuarial Accrued Liability	$ 1,122,610	$ 1,091,795	$ 1,062,461
Actuarial Value of Assets	589,848	589,848	589,848
Unfunded Actuarial Accrued Liability	532,762	501,947	472,613
Funded Ratio	52.5%	54.0%	55.5%
Actuarially Determined Contribution Rate	71.10%	65.79%	60.75%
Insurance			
Actuarial Accrued Liability	$ 245,842	$ 244,059	$ 242,369
Actuarial Value of Assets	245,172	245,172	245,172
Unfunded Actuarial Accrued Liability	670	(1,113)	(2,803)
Funded Ratio	99.7%	100.5%	101.2%
Actuarially Determined Contribution Rate	2.78%	2.31%	1.87%
Combined			
Actuarial Accrued Liability	$ 1,368,452	$ 1,335,854	$ 1,304,830
Actuarial Value of Assets	835,020	835,020	835,020
Unfunded Actuarial Accrued Liability	533,432	500,834	469,810
Funded Ratio	61.0%	62.5%	64.0%
Actuarially Determined Contribution Rate	73.88%	68.10%	62.62%

Sensitivity Analysis - Payroll Growth

(Dollar amounts expressed in thousands)

(1)	Decrease Payroll Growth (2)	Valuation Results (3)	Increase Payroll Growth (4)
Payroll Growth Rate	-1.00%	0.00%	1.00%
Inflation Rate	2.50%	2.50%	2.50%
Discount Rate - Retirement	5.25%	5.25%	5.25%
Discount Rate - Insurance	6.50%	6.50%	6.50%
Retirement			
Actuarial Accrued Liability	$ 1,091,795	$ 1,091,795	$ 1,091,795
Actuarial Value of Assets	589,848	589,848	589,848
Unfunded Actuarial Accrued Liability	501,947	501,947	501,947
Funded Ratio	54.0%	54.0%	54.0%
Actuarially Determined Contribution Rate	71.58%	65.79%	60.40%
Insurance			
Actuarial Accrued Liability	$ 244,059	$ 244,059	$ 244,059
Actuarial Value of Assets	245,172	245,172	245,172
Unfunded Actuarial Accrued Liability	(1,113)	(1,113)	(1,113)
Funded Ratio	100.5%	100.5%	100.5%
Actuarially Determined Contribution Rate	2.29%	2.31%	2.33%
Combined			
Actuarial Accrued Liability	$ 1,335,854	$ 1,335,854	$ 1,335,854
Actuarial Value of Assets	835,020	835,020	835,020
Unfunded Actuarial Accrued Liability	500,834	500,834	500,834
Funded Ratio	62.5%	62.5%	62.5%
Actuarially Determined Contribution Rate	73.87%	68.10%	62.73%

Kentucky Public Pensions Authority
SPRS Retirement Fund
($ in Millions)

Fiscal Year Beginning July 1,	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Funded Ratio (3) / (2)	Employer Contribution	Member Contribution	Covered Payroll	Employer Contribution as % of Covered Payroll	Employer Actuarially Determined Contribution
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2023	$ 1,092	$ 590	$ 502	54%	$ 56	$ 5	$ 66	85.32%	85.39%
2024	1,101	619	482	56%	43	5	66	65.79%	65.79%
2025	1,107	635	472	57%	43	5	66	65.79%	65.03%
2026	1,111	640	471	58%	42	5	66	64.12%	64.12%
2027	1,114	652	462	59%	42	5	66	64.12%	64.58%
2028	1,116	661	455	59%	42	5	66	64.01%	64.01%
2029	1,118	670	448	60%	42	5	66	64.01%	63.74%
2030	1,119	679	440	61%	42	5	66	63.49%	63.49%
2031	1,120	688	432	61%	42	5	66	63.49%	63.32%
2032	1,122	698	424	62%	42	5	66	63.17%	63.17%
2033	1,123	709	414	63%	42	5	66	63.17%	63.05%
2034	1,126	721	405	64%	41	5	66	62.95%	62.95%
2035	1,129	734	395	65%	41	5	66	62.95%	62.87%
2036	1,133	748	385	66%	41	5	66	62.77%	62.77%
2037	1,137	763	374	67%	41	5	66	62.77%	62.69%
2038	1,142	779	363	68%	41	5	66	62.58%	62.58%
2039	1,147	796	351	69%	41	5	66	62.58%	62.48%
2040	1,152	814	338	71%	41	5	66	61.75%	61.75%
2041	1,157	832	325	72%	41	5	66	61.75%	92.05%
2042	1,163	851	312	73%	61	5	66	92.56%	92.56%
2043	1,169	892	277	76%	61	5	66	92.56%	94.01%
2044	1,175	935	240	80%	62	5	66	94.36%	94.36%
2045	1,180	981	199	83%	62	5	66	94.36%	94.87%
2046	1,185	1,028	157	87%	62	5	66	94.13%	94.13%
2047	1,190	1,077	113	91%	62	5	66	94.13%	94.42%
2048	1,194	1,128	66	95%	62	5	66	94.44%	94.44%
2049	1,197	1,197	-	100%	12	5	66	18.84%	18.84%
2050	1,199	1,199	-	100%	12	5	66	18.85%	18.85%
2051	1,200	1,200	-	100%	12	5	66	18.88%	18.88%
2052	1,200	1,200	-	100%	12	5	66	18.89%	18.89%

Notes and assumptions:

The projection is based on the results of the June 30, 2023 actuarial valuation and assumes that all actuarial assumptions are realized, including the assumed annual asset return of 5.25%.

New active members are assumed to be hired as current active members are assumed to terminate employment or retire.

The total active population is assumed to decrease 2% each year for each of the next 30 years.

Covered payroll is assumed to remain level throughout the entire projection.

The contribution rate established in the Commonwealth's biennium budget is assumed to be equal to the full actuarially determined contribution rate.

Kentucky Public Pensions Authority
SPRS Insurance Fund
($ in Millions)

Fiscal Year Beginning July 1,	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Funded Ratio (3) / (2)	Employer Contribution	Member Contribution	Covered Payroll	Employer Contribution as % of Covered Payroll	Employer Actuarially Determined Contribution
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
2023	$ 244	$ 245	$ (1)	100%	$ 9	$ -	$ 66	14.11%	3.68%
2024	247	257	(10)	104%	2	-	66	2.31%	2.31%
2025	248	261	(13)	105%	2	-	66	2.31%	1.31%
2026	248	256	(8)	103%	-	-	66	0.13%	0.13%
2027	246	254	(8)	103%	-	1	66	0.13%	0.33%
2028	244	250	(6)	103%	-	1	66	0.00%	0.00%
2029	240	245	(5)	102%	-	1	66	0.00%	0.00%
2030	236	240	(4)	102%	-	1	66	0.00%	0.00%
2031	232	234	(2)	101%	-	1	66	0.00%	0.00%
2032	227	227	-	100%	-	1	66	0.00%	0.00%
2033	221	220	1	100%	-	1	66	0.00%	0.00%
2034	216	213	3	99%	-	1	66	0.00%	0.00%
2035	210	205	5	98%	-	1	66	0.00%	0.00%
2036	205	198	7	97%	-	1	66	0.00%	0.00%
2037	200	191	9	96%	-	1	66	0.00%	0.00%
2038	196	185	11	94%	-	1	66	0.00%	0.00%
2039	193	179	14	93%	-	1	66	0.00%	0.00%
2040	190	174	16	92%	-	1	66	0.00%	0.00%
2041	188	169	19	90%	-	1	66	0.00%	0.80%
2042	186	165	21	89%	5	1	66	7.98%	7.98%
2043	185	167	18	90%	5	1	66	7.98%	8.43%
2044	185	170	15	92%	6	1	66	8.76%	8.76%
2045	186	174	12	94%	6	1	66	8.76%	9.45%
2046	187	178	9	95%	6	1	66	8.94%	8.94%
2047	188	184	4	98%	6	1	66	8.94%	9.15%
2048	190	189	1	100%	6	1	66	9.19%	9.19%
2049	191	191	-	100%	-	1	66	0.66%	0.66%
2050	193	193	-	100%	-	1	66	0.69%	0.69%
2051	194	194	-	100%	-	1	66	0.74%	0.74%
2052	195	195	-	100%	1	1	66	0.80%	0.80%

<u>Notes and assumptions:</u>

The projection is based on the results of the June 30, 2023 actuarial valuation and assumes that all actuarial assumptions are realized, including the assumed annual asset return of 6.50%.

New active members are assumed to be hired as current active members are assumed to terminate employment or retire.

The total active population is assumed to decrease 2% each year for each of the next 30 years.

Covered payroll is assumed to remain level throughout the entire projection.

The contribution rate established in the Commonwealth's biennium budget is assumed to be equal to the full actuarially determined contribution rate.

P: 469.524.0000 | www.grsconsulting.com

December 5, 2023

Mr. David Eager
Executive Director
Kentucky Public Pensions Authority
1260 Louisville Road
Frankfort, KY 40601

Re: Contribution Necessary to Fully Prefund a 1.5% Increase in Retiree Benefits on the Systems Operated by the Kentucky Public Pensions Authority on July 1, 2024

Dear Mr. Eager:

The purpose of this letter is to communicate the financial cost if the General Assembly enacts an increase in monthly retirement allowances as permitted under KRS 61.691(2) and KRS 78.5518(2).

As of the June 30, 2023 actuarial valuation, there are no pension funds with a funding level greater than 100%, and therefore, no increase in monthly retirement allowance can be paid under KRS 61.691(2)(b)1 and KRS 78.5518(2)(b)1.

The contribution necessary to fully prefund a 1.5% increase in all monthly retirement allowances paid by the corresponding pension funds as of July 1, 2024 is provided below. The respective appropriations provided below are sufficient and appropriate to fund a 1.5% benefit increase and therefore, the benefit increase would not impact the on-going employer contribution requirement for the pension funds.

Pension Fund	Appropriation Necessary to Fully Prefund a 1.5% Increase in Retirement Allowances as of July 1, 2024
KERS Non-Hazardous	$170 million
KERS Hazardous	$13 million
SPRS	$13 million
CERS Non-Hazardous	$137 million
CERS Hazardous	$58 million

The table above reflects the cost of a one-time 1.5% increase in retiree benefits on July 1, 2024 or July 1, 2025. If a 1.5% increase is provided annually over the biennium (i.e. if two 1.5% increases are provided – one on July 1, 2024 and one on July 1, 2025), the cost would be two times what is shown in the table. For example, the cost to the KERS non-hazardous fund would be $340 million ($170 million for each increase).

5605 North MacArthur Boulevard | Suite 870 | Irving, Texas 75038-2631

Basis of Calculations

GRS based the calculations and analysis in this letter on the member and financial data provided by KPPA for use in performing the actuarial valuation as of June 30, 2023. Our calculations are based upon assumptions regarding future events, which may or may not materialize. Depending on actual plan experience, actual results could deviate significantly.

All three of the undersigned are members of the American Academy of Actuaries and meet all of the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. In addition, all three are independent of KPPA and are experienced in performing valuations for large public retirement systems. This communication shall not be construed to provide tax advice, legal advice or investment advice.

Sincerely,
Gabriel, Roeder, Smith & Company

Daniel J. White, FSA, EA, MAAA
Senior Consultant

Janie Shaw, ASA, EA, MAAA
Consultant

Krysti Kiesel, ASA, MAAA
Consultant and Actuary