

# County Employees Retirement System (CERS)

Actuarial Valuation Report  
as of June 30, 2021





December 1, 2021

Board of Trustees  
County Employees Retirement System  
Perimeter Park West  
1260 Louisville Road  
Frankfort, KY 40601

**Subject: Actuarial Valuation as of June 30, 2021**

Dear Trustees of the Board:

This report describes the current actuarial condition of the County Employees Retirement System (CERS) and provides the actuarially determined employer contribution rates for fiscal year ending June 30, 2023. In addition, the report analyzes changes in CERS'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 CERS. This report was prepared at the request of the Board of Trustees of the County Employees Retirement System (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 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, 2022. If new legislation is enacted between the valuation date and the date the contribution rates become effective, the Board may adjust the calculated rates before certifying them, in order to reflect this new legislation. Such adjustments are based on information supplied by the actuary.

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 (28 years remaining as of June 30, 2021). Gains and losses incurring in years after June 30, 2019 are amortized as separate closed 20-year amortization bases. House Bill 362 (passed during the 2018 legislative session) limits the increases to the employer contribution rates to 12% over the prior fiscal year through June 30, 2028.

#### **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 were adopted by the Board for first use in the June 30, 2019 actuarial valuation and are based on an experience study conducted with experience through June 30, 2018. There were no changes in actuarial assumptions or methods since the prior 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.

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**

The benefit provisions reflected in these valuations are those which were in effect on June 30, 2021. Senate Bill 169 passed during the 2021 legislative session and increased the disability benefits for certain members who become “totally and permanently disabled” in the line of duty or as a result of a duty-related disability. 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, 2021, by KPPA staff. The staff also supplied asset information as of June 30, 2021. 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 CERS as of June 30, 2021.

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.

The undersigned are independent actuaries and consultants. Both of the undersigned are Enrolled Actuaries, Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. Both of the undersigned 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



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# SECTION 1

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## EXECUTIVE SUMMARY

**Summary of Principal Results**  
(Dollar amounts expressed in thousands)

	Non-Hazardous		Hazardous		Total	
	June 30, 2021	June 30, 2020	June 30, 2021	June 30, 2020	June 30, 2021	June 30, 2020
<b>Actuarially Determined Contribution:</b>						
Retirement	23.40%	23.88%	42.81%	43.23%		
Insurance	<u>3.39%</u>	<u>4.17%</u>	<u>6.78%</u>	<u>8.73%</u>		
Total	26.79%	28.05%	49.59%	51.96%	N/A	N/A
<b>Contribution Rate for Next Fiscal Year<sup>1</sup></b>	26.79%	26.95%	49.59%	44.33%		
<b>Assets:</b>						
Retirement						
• Actuarial value (AVAR)	\$7,715,883	\$7,220,607	\$2,628,621	\$2,447,885	\$10,344,504	\$9,668,492
• Market value (MVAR)	\$8,565,652	\$7,027,327	\$2,914,408	\$2,379,704	\$11,480,060	\$9,407,031
• Ratio of actuarial to market value of assets	90.1%	102.8%	90.2%	102.9%	90.1%	102.8%
Insurance						
• Actuarial value (AVAI)	\$2,947,312	\$2,661,351	\$1,475,635	\$1,362,028	\$4,422,947	\$4,023,379
• Market value (MVAI)	\$3,246,801	\$2,581,613	\$1,627,824	\$1,321,117	\$4,874,625	\$3,902,730
• Ratio of actuarial to market value of assets	90.8%	103.1%	90.7%	103.1%	90.7%	103.1%
<b>Funded Status:</b>						
Retirement						
• Actuarial accrued liability	\$14,894,906	\$14,610,868	\$5,629,458	\$5,431,299	\$20,524,364	\$20,042,167
• Unfunded accrued liability on AVAR	\$7,179,023	\$7,390,261	\$3,000,837	\$2,983,414	\$10,179,860	\$10,373,675
• Funded ratio on AVAR	51.8%	49.4%	46.7%	45.1%	50.4%	48.2%
• Unfunded accrued liability on MVAR	\$6,329,254	\$7,583,541	\$2,715,050	\$3,051,595	\$9,044,304	\$10,635,136
• Funded ratio on MVAR	57.5%	48.1%	51.8%	43.8%	55.9%	46.9%
Insurance						
• Actuarial accrued liability	\$3,450,484	\$3,392,085	\$1,751,203	\$1,740,971	\$5,201,687	\$5,133,056
• Unfunded accrued liability on AVAI	\$503,172	\$730,734	\$275,568	\$378,943	\$778,740	\$1,109,677
• Funded ratio on AVAI	85.4%	78.5%	84.3%	78.2%	85.0%	78.4%
• Unfunded accrued liability on MVAI	\$203,683	\$810,472	\$123,379	\$419,854	\$327,062	\$1,230,326
• Funded ratio on MVAI	94.1%	76.1%	93.0%	75.9%	93.7%	76.0%
<b>Membership:</b>						
• Number of						
- Active Members	77,367	81,250	9,173	9,419	86,540	90,669
- Retirees and Beneficiaries	67,206	65,414	10,858	10,452	78,064	75,866
- Inactive Members	100,738	95,692	3,895	3,590	104,633	99,282
- Total	245,311	242,356	23,926	23,461	269,237	265,817
• Projected payroll of active members	\$2,528,735	\$2,565,391	\$578,355	\$568,558	\$3,107,090	\$3,133,949
• Average salary of active members	\$32,685	\$31,574	\$63,050	\$60,363	\$35,904	\$34,565

<sup>1</sup> Contribution rates reflect House Bill 362 (passed during the 2018 legislative session), which limits the increases to the employer contribution rates to 12% over the prior fiscal year through June 30, 2028. Contribution rates calculated with the June 30, 2021 valuation (June 30, 2020 valuation) are effective for fiscal year ending June 30, 2023 (June 30, 2022).

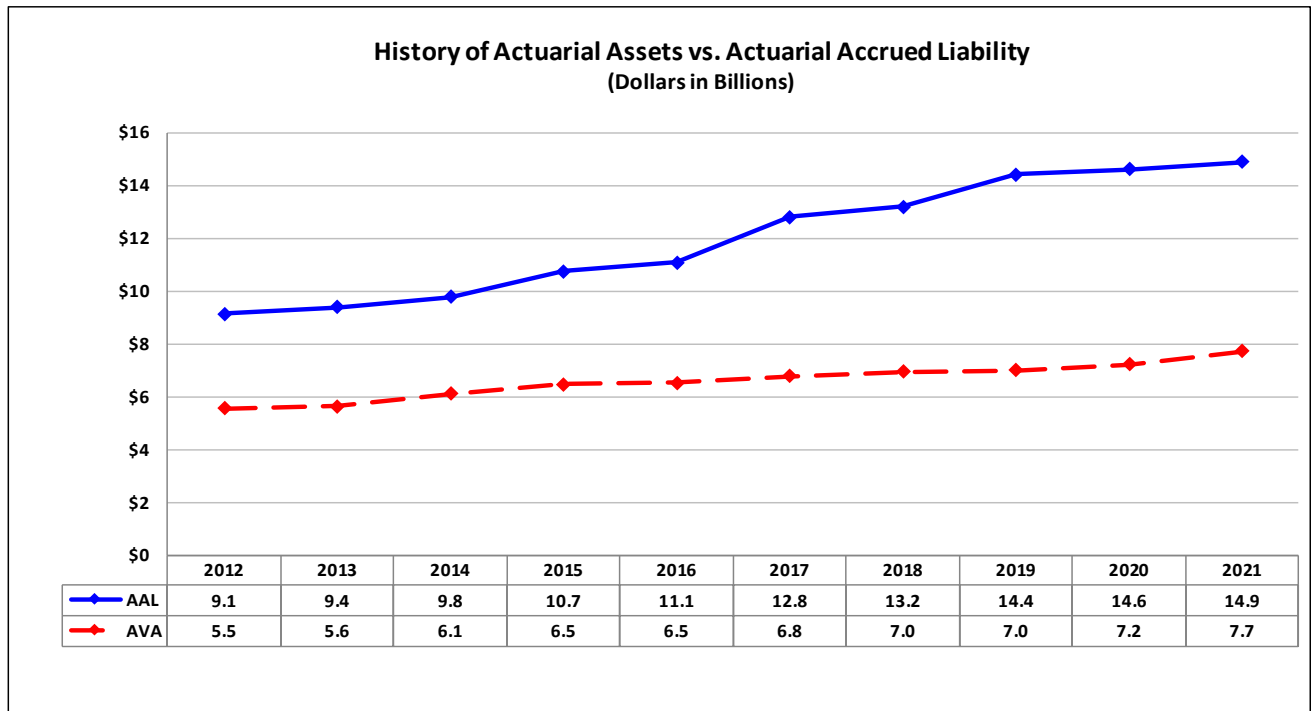


## Executive Summary (Continued)

### Non-Hazardous Retirement Fund

The unfunded actuarial accrued liability of the non-hazardous retirement fund decreased by \$211 million since the prior year's valuation to \$7.179 billion. The unfunded liability was expected to increase by \$107 million so actual experience resulted in an unfunded liability that was approximately \$318 million less than expected, primarily due to favorable investment experience in the past year.

Below is a chart with the historical actuarial value of assets and actuarial accrued liability. The divergence in the assets and liability over the last ten years has generally been due to: (1) actual contributions being insufficient to finance the unfunded actuarial accrued liability, and (2) decreases in the assumed rate of return between 2015 and 2017.



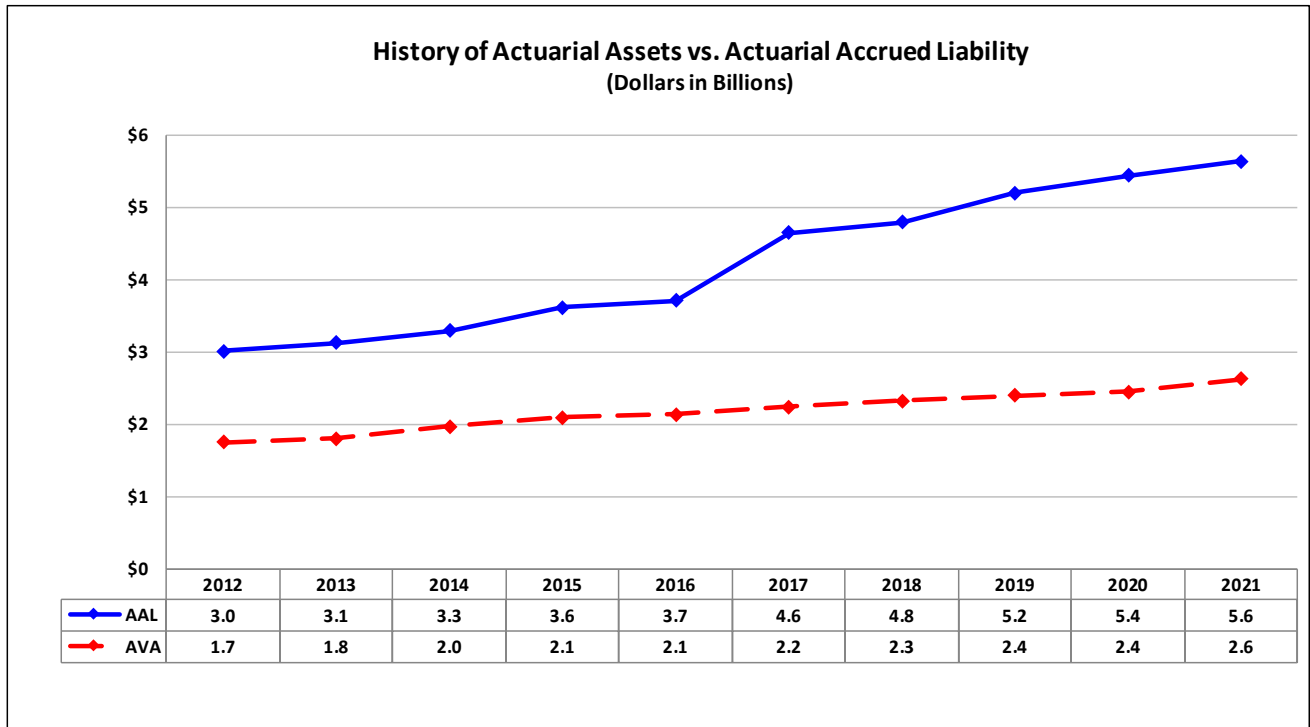


## Executive Summary (Continued)

### Hazardous Retirement Fund

The unfunded actuarial accrued liability of the hazardous retirement fund increased by \$17 million since the prior year's valuation to \$3.001 billion. This increase was approximately \$39 million less than expected, primarily due to favorable investment experience in the past year. The favorable investment experience was partially offset by liability losses, primarily due to higher than expected salary increases for active members.

Below is a chart with the historical actuarial value of assets and actuarial accrued liability. The divergence in the assets and liability over the last ten years has generally been due to: (1) actual contributions being insufficient to finance the unfunded actuarial accrued liability, and (2) decreases in the assumed rate of return between 2015 and 2017.



## Executive Summary (Continued)

### Summary of Change in Financial Condition of the Insurance Funds

Both the 2022 non-Medicare and Medicare premiums were lower than expected based on the prior year's actuarial assumptions, which resulted in lower than expected accrued liability for the insurance fund.

Specifically, the non-Medicare premiums were expected to increase by 6.4% from calendar year 2021 to calendar year 2022 (i.e. the medical trend assumption for non-Medicare premiums) and the actual premiums increased by approximately 2.4%. The Medicare premiums were expected to increase by 2.9% from calendar year 2021 to calendar year 2022, which was based on the "Not to Exceed" 2022 Medicare premiums that Humana provided in 2021. Actual Medicare premiums increased by approximately 2.0%.

#### Non-Hazardous Insurance Fund

Since the prior year's valuation, the unfunded actuarial accrued liability of the non-hazardous insurance fund decreased by \$228 million since the prior year's valuation to \$503 million. This decrease was approximately \$209 million more than expected, which includes a \$95 million gain due to favorable investment experience and a \$45 million gain due to the favorable premium experience. The corresponding funded ratio increased from 78.5% at June 30, 2020 to 85.4% at June 30, 2021.

#### Hazardous Insurance Fund

Since the prior year's valuation, the unfunded actuarial accrued liability of the hazardous insurance fund decreased by \$103 million since the prior year's valuation to \$276 million. This decrease was approximately \$94 million more than expected, which includes a \$49 million gain due to favorable investment experience and a \$40 million gain due to the favorable premium experience. The corresponding funded ratio increased from 78.2% at June 30, 2020 to 84.3% at June 30, 2021.

## SECTION 2

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### DISCUSSION

## Discussion

The County Employees Retirement System (CERS) is a cost-sharing, multiple-employer defined benefit pension plan that provides coverage for regular full-time members employed by positions of each participating county, city, and school board, and any additional eligible local agencies electing to participate in CERS. CERS includes both non-hazardous and hazardous duty benefits. This report presents the results of the June 30, 2021 actuarial funding valuation for both the Retirement Funds and Insurance Funds.

The primary purposes of the valuation report are to describe the current actuarial condition of CERS and provide the actuarially determined employer contribution rates for fiscal year ending June 30, 2023. In addition, the report analyzes changes in CERS'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 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.

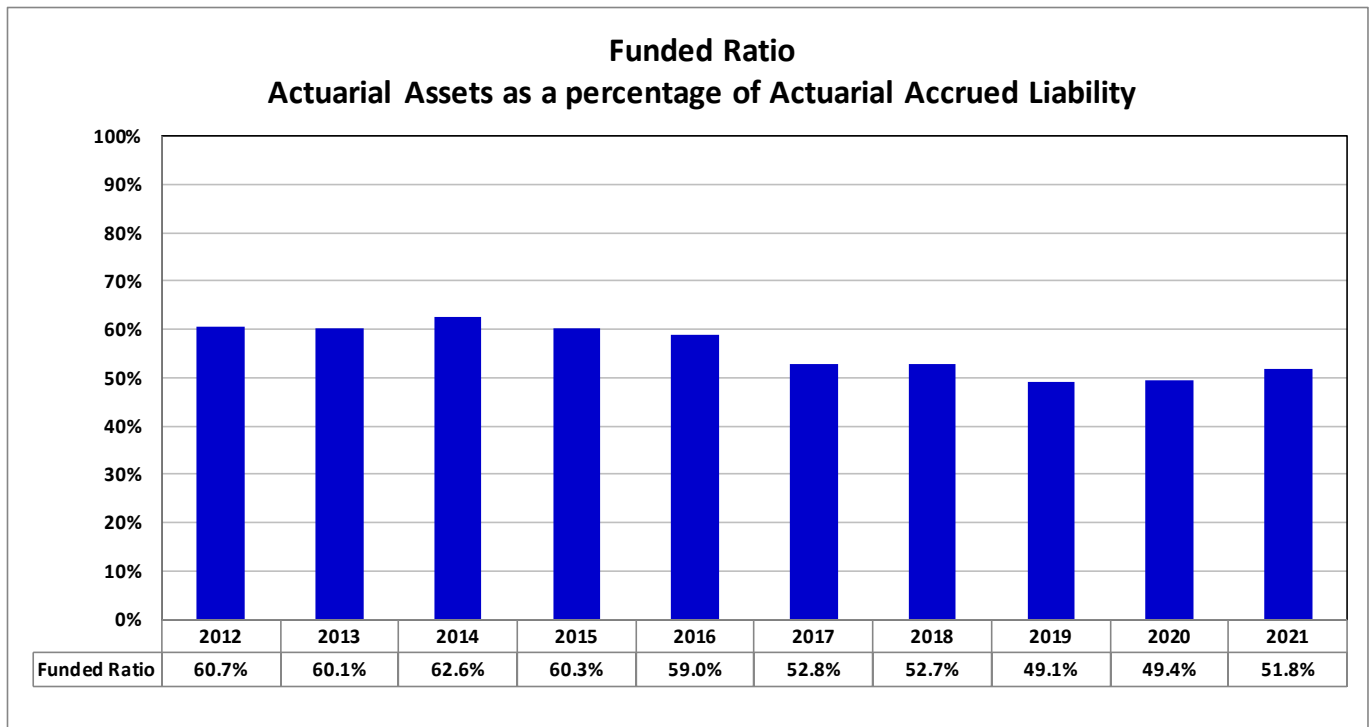


## Funding Progress

The following charts provide a ten-year history of the retirement funds' funded ratio (i.e. the Actuarial Value of Assets divided by the Actuarial Accrued Liability). The decline in the funded ratio over the last ten years has generally been due to: (1) actual contributions being insufficient to finance the unfunded actuarial accrued liability, and (2) decreases in the assumed rate of return between 2015 and 2017.

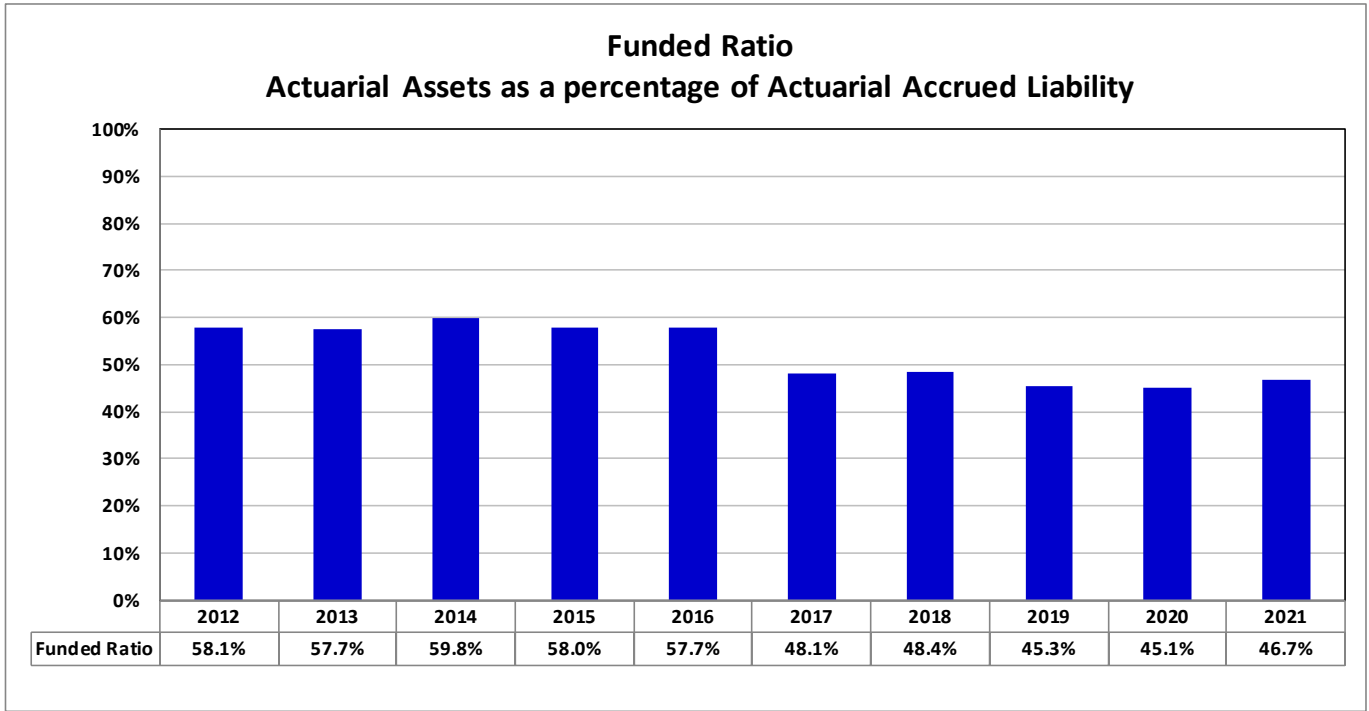
The funded ratio increased from 2020 to 2021 for both the non-hazardous and hazardous funds. Now that the full actuarially determined contributions have been fully phased-in and absent future unfavorable experience, the funded ratio is expected to continue improving. Also, the dollar amount of the unfunded actuarial accrued liability, or the difference between the actuarial accrued liability and the actuarial value of assets, is expected to begin decreasing. Table 9, Schedule of Funding Progress, in the following section of the report provides additional detail regarding the funding progress of the Retirement Funds.

### Non-Hazardous Retirement Fund



# Funding Progress (Continued)

## Hazardous Retirement Fund



## 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.

### Non-Hazardous Retirement Fund

The actuarial value of assets for the non-hazardous retirement fund increased from \$7.221 billion to \$7.716 billion 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 25.5% which is greater than the 6.25% expected annual return. The return on an actuarial (smoothed) asset value was 10.1%, which resulted in a \$275.4 million gain for the fiscal year. This difference in the estimated return on market value and actuarial value illustrates the smoothing effect of the asset valuation method. The market value of assets is \$850 million greater than the actuarial value of assets, which signifies that the retirement fund is in a position of deferred gains to be realized in future years.

### Hazardous Retirement Fund

Likewise, the actuarial value of assets for the hazardous retirement fund increased from \$2.448 billion to \$2.629 billion 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 25.4% which is greater than the 6.25% expected annual return. The return on an actuarial (smoothed) asset value was 10.0%, which resulted in a \$91.6 million gain for the fiscal year. The market value of assets is \$286 million greater than the actuarial value of assets, which signifies that the retirement fund is in a position of deferred 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. Tables 7 and 8 provide 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 are tables that separately show 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.

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

	Non-Hazardous	Hazardous
A. Calculation of total actuarial gain or loss		
1. Unfunded actuarial accrued liability (UAAL), previous year	\$ 7,390,261	\$ 2,983,414
2. Normal cost and administrative expenses	293,994	108,026
3. Less: contributions for the year	(637,926)	(234,573)
4. Interest accrual	451,143	182,509
5. Expected UAAL (Sum of Items 1 - 4)	\$ 7,497,472	\$ 3,039,376
6. Actual UAAL as of June 30, 2021	\$ 7,179,023	\$ 3,000,837
7. Total gain (loss) for the year (Item 5 - Item 6)	\$ 318,449	\$ 38,539
B. Source of gains and losses		
8. Asset gain (loss) for the year	\$ 275,416	\$ 91,616
9. Liability experience gain (loss) for the year	47,138	(52,744)
10. Plan Change	(4,105)	(333)
11. Assumption change	—	—
12. Total	\$ 318,449	\$ 38,539

The accrued liability was approximately 0.3% less than expected and 0.9% more than expected for the non-hazardous and hazardous funds, respectively, resulting in the liability experience gains/losses shown above. This experience for the non-hazardous fund was primarily due to lower than expected salary increases for active members and the experience for the hazardous fund was primarily due to higher than expected salary increases for active members.





## Actuarial Gains/ (Losses) (Continued)

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

	Non-Hazardous	Hazardous
A. Calculation of total actuarial gain or loss		
1. Unfunded actuarial accrued liability (UAAL), previous year	\$ 730,734	\$ 378,943
2. Normal cost and administrative expenses	81,331	30,448
3. Less: contributions for the year	(143,517)	(62,897)
4. Interest accrual	43,728	22,670
5. Expected UAAL (Sum of Items 1 - 4)	\$ 712,276	\$ 369,164
6. Actual UAAL as of June 30, 2021	\$ 503,172	\$ 275,568
7. Total gain (loss) for the year (Item 5 - Item 6)	\$ 209,104	\$ 93,596
B. Source of gains and losses		
8. Asset gain (loss) for the year	\$ 94,770	\$ 49,310
9. Liability experience gain (loss) for the year	117,360	45,344
10. Plan Change	(3,026)	(1,058)
11. Assumption change	—	—
12. Total	\$ 209,104	\$ 93,596

The liability experience gains shown above include a \$45 million gain for the non-hazardous fund and a \$40 million gain for the hazardous fund due to the funds' favorable premium experience. See the discussion in the Executive Summary for additional information.

## 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.

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 last updated at the June 30, 2020 valuation. All other assumptions were adopted by the Board for first use in the June 30, 2019 actuarial valuation and are based on an experience study conducted based on experience through June 30, 2018. There were no changes in actuarial assumptions or methods since the prior valuation.

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.



## Benefit Provisions

Appendix B of this report includes a summary of the major benefit provisions for System.

Senate Bill 169 passed during the 2021 legislative session and increased the disability benefits for qualified members who become “totally and permanently disabled” in the line of duty or as a result of a duty-related disability. The minimum disability benefit increased from 25% of the member’s monthly final rate of pay to 75% of the member’s monthly average pay. 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.

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

## **SECTION 3**

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### **ACTUARIAL TABLES**

# Actuarial Tables

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2	19	ACTUARIAL PRESENT VALUE OF FUTURE BENEFITS
3	20	DEVELOPMENT OF REQUIRED CONTRIBUTION RATE
4	21	ACTUARIAL BALANCE SHEET – NON-HAZARDOUS MEMBERS
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## **RETIREMENT BENEFITS**

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### **ACTUARIAL TABLES**

## Development of Unfunded Actuarial Accrued Liability Retirement Benefits

(Dollar amounts expressed in thousands)

	June 30, 2021	
	Non-Hazardous (1)	Hazardous (2)
1. Projected payroll of active members	\$ 2,528,735	\$ 578,355
2. Present value of future pay	\$ 19,509,117	\$ 5,069,067
3. Normal cost rate		
a. Total normal cost rate	10.44%	18.39%
b. Less: member contribution rate	-5.00%	-8.00%
c. Employer normal cost rate	5.44%	10.39%
4. Actuarial accrued liability for active members		
a. Present value of future benefits	\$ 7,407,127	\$ 2,717,895
b. Less: present value of future normal costs	(1,910,189)	(865,750)
c. Actuarial accrued liability	\$ 5,496,938	\$ 1,852,145
5. Total actuarial accrued liability		
a. Retirees and beneficiaries	\$ 8,774,177	\$ 3,699,392
b. Inactive members	623,791	77,921
c. Active members (Item 4c)	5,496,938	1,852,145
d. Total	\$ 14,894,906	\$ 5,629,458
6. Actuarial value of assets	\$ 7,715,883	\$ 2,628,621
7. Unfunded actuarial accrued liability (UAAL) (Item 5d - Item 6)	\$ 7,179,023	\$ 3,000,837
8. Funded Ratio	51.8%	46.7%



**Actuarial Present Value of Future Benefits  
Retirement Benefits**

(Dollar amounts expressed in thousands)

	June 30, 2021	
	Non-Hazardous (1)	Hazardous (2)
1. Active members		
a. Service retirement	\$ 6,527,367	\$ 2,466,372
b. Deferred termination benefits and refunds	447,670	106,229
c. Survivor benefits	126,285	22,917
d. Disability benefits	305,805	122,377
e. Total	<u>\$ 7,407,127</u>	<u>\$ 2,717,895</u>
2. Retired members		
a. Service retirement	\$ 7,775,419	\$ 3,365,052
b. Disability retirement	468,076	115,412
c. Beneficiaries	530,682	218,928
d. Total	<u>\$ 8,774,177</u>	<u>\$ 3,699,392</u>
3. Inactive members		
a. Vested terminations	\$ 553,657	\$ 69,478
b. Nonvested terminations	70,134	8,443
c. Total	<u>\$ 623,791</u>	<u>\$ 77,921</u>
4. Total actuarial present value of future benefits	<u>\$ 16,805,095</u>	<u>\$ 6,495,208</u>



## Development of Actuarially Determined Contribution Rate Retirement Benefits

	June 30, 2021	
	Non-Hazardous (1)	Hazardous (2)
1. Total normal cost rate		
a. Service retirement	7.13%	14.53%
b. Deferred termination benefits and refunds	2.22%	2.22%
c. Survivor benefits	0.37%	0.29%
d. Disability benefits	<u>0.72%</u>	<u>1.35%</u>
e. Total	10.44%	18.39%
2. Less: member contribution rate	<u>-5.00%</u>	<u>-8.00%</u>
3. Total employer normal cost rate	5.44%	10.39%
4. Administrative expenses	<u>0.86%</u>	<u>0.32%</u>
5. Net employer normal cost rate	6.30%	10.71%
6. UAAL amortization contribution rate	<u>17.10%</u>	<u>32.10%</u>
7. Total calculated employer contribution	23.40%	42.81%

**Actuarial Balance Sheet**  
**Non-Hazardous Members Retirement**  
(Dollar amounts expressed in thousands)

	<u>June 30, 2021</u>	<u>June 30, 2020</u>
	(1)	(2)
1. Assets - Present and Expected Future Resources		
a. Current assets (actuarial value)	\$ 7,715,883	\$ 7,220,607
b. Present value of future member contributions	\$ 975,456	\$ 988,813
c. Present value of future employer contributions		
i. Normal cost contributions	\$ 934,733	\$ 980,126
ii. Unfunded accrued liability contributions	<u>7,179,023</u>	<u>7,390,261</u>
iii. Total future employer contributions	\$ 8,113,756	\$ 8,370,387
d. Total assets	\$ 16,805,095	\$ 16,579,807
2. Liabilities - Present Value of Expected Future Benefit Payments		
a. Active members		
i. Present value of future normal costs	\$ 1,910,189	\$ 1,968,939
ii. Accrued liability	<u>5,496,938</u>	<u>5,522,631</u>
iii. Total present value of future benefits	\$ 7,407,127	\$ 7,491,570
b. Present value of benefits payable on account of current retired members and beneficiaries	\$ 8,774,177	\$ 8,501,757
c. Present value of benefits payable on account of current inactive members	\$ 623,791	\$ 586,480
d. Total liabilities	\$ 16,805,095	\$ 16,579,807



**Actuarial Balance Sheet**  
**Hazardous Members Retirement**  
(Dollar amounts expressed in thousands)

	<u>June 30, 2021</u>	<u>June 30, 2020</u>
	(1)	(2)
1. Assets - Present and Expected Future Resources		
a. Current assets (actuarial value)	\$ 2,628,621	\$ 2,447,885
b. Present value of future member contributions	\$ 405,525	\$ 393,591
c. Present value of future employer contributions		
i. Normal cost contributions	\$ 460,225	\$ 461,175
ii. Unfunded accrued liability contributions	<u>3,000,837</u>	<u>2,983,414</u>
iii. Total future employer contributions	\$ 3,461,062	\$ 3,444,589
d. Total assets	\$ 6,495,208	\$ 6,286,065
2. Liabilities - Present Value of Expected Future Benefit Payments		
a. Active members		
i. Present value of future normal costs	\$ 865,750	\$ 854,766
ii. Accrued liability	<u>1,852,145</u>	<u>1,825,208</u>
iii. Total present value of future benefits	\$ 2,717,895	\$ 2,679,974
b. Present value of benefits payable on account of current retired members and beneficiaries	\$ 3,699,392	\$ 3,537,224
c. Present value of benefits payable on account of current inactive members	\$ 77,921	\$ 68,867
d. Total liabilities	\$ 6,495,208	\$ 6,286,065



## Reconciliation of Retirement Net Assets

(Dollar amounts expressed in thousands)<sup>1</sup>

	Year Ending	
	June 30, 2021	June 30, 2021
	(1)	(2)
	Non-Hazardous	Hazardous
1. Value of assets at beginning of year	\$ 7,027,327	\$ 2,379,704
2. Revenue for the year		
a. Contributions		
i. Member contributions	\$ 165,698	\$ 62,367
ii. Employer contributions	472,196	172,089
iii. Other contributions (less 401h)	32	116
iv. Total	\$ 637,926	\$ 234,573
b. Income		
i. Interest, dividends, and other income	\$ 218,835	\$ 73,662
ii. Investment expenses	(83,124)	(27,813)
iii. Net	\$ 135,711	\$ 45,850
c. Net realized and unrealized gains (losses)	1,627,028	550,792
d. Total revenue	\$ 2,400,665	\$ 831,214
3. Expenditures for the year		
a. Disbursements		
i. Refunds	\$ 13,862	\$ 4,662
ii. Regular annuity benefits	826,749	289,999
iii. Other benefit payments	0	0
iv. Transfers to other systems	0	0
v. Total	\$ 840,611	\$ 294,662
b. Administrative expenses and depreciation	21,729	1,848
c. Total expenditures	\$ 862,340	\$ 296,510
4. Increase in net assets (Item 2. - Item 3.)	\$ 1,538,325	\$ 534,704
5. Value of assets at end of year (Item 1. + Item 4.)	\$ 8,565,652	\$ 2,914,408
6. Net external cash flow		
a. Dollar amount	\$ (224,414)	\$ (61,937)
b. Percentage of market value	-2.9%	-2.3%
7. Estimated annual return on net assets	25.5%	25.4%

<sup>1</sup> Amounts may not add due to rounding

<sup>1</sup> Excludes 401h assets



**Development of Actuarial Value of Assets**  
**Non-Hazardous Members Retirement**  
**(Dollar amounts expressed in thousands)\***

Year Ending	June 30, 2021																												
1. Actuarial value of assets at beginning of year	\$ 7,220,607																												
2. Market value of assets at beginning of year	\$ 7,027,327																												
3. Net new investments																													
a. Contributions	\$ 637,926																												
b. Benefit payments	(840,611)																												
c. Administrative expenses	(21,729)																												
d. Subtotal	\$ (224,414)																												
4. Market value of assets at end of year	\$ 8,565,652																												
5. Net earnings (Item 4. - Item 2. - Item 3.d.)	\$ 1,762,739																												
6. Assumed investment return rate for fiscal year	6.25%																												
7. Expected return for immediate recognition	\$ 432,195																												
8. Excess return for phased recognition	\$ 1,330,544																												
9. Phased-in recognition, 20% of excess return on assets for prior years:																													
	<table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="text-align: center; border-bottom: 1px solid black;">Fiscal Year Ending June 30,</th> <th style="text-align: center; border-bottom: 1px solid black;">Excess Return</th> <th style="text-align: center; border-bottom: 1px solid black;">Recognized Amount</th> </tr> </thead> <tbody> <tr> <td style="padding-left: 20px;">a.</td> <td style="text-align: center;">2021</td> <td style="text-align: right;">\$ 1,330,544</td> <td style="text-align: right;">\$ 266,109</td> </tr> <tr> <td style="padding-left: 20px;">b.</td> <td style="text-align: center;">2020</td> <td style="text-align: right;">(385,418)</td> <td style="text-align: right;">(77,084)</td> </tr> <tr> <td style="padding-left: 20px;">c.</td> <td style="text-align: center;">2019</td> <td style="text-align: right;">(40,218)</td> <td style="text-align: right;">(8,044)</td> </tr> <tr> <td style="padding-left: 20px;">d.</td> <td style="text-align: center;">2018</td> <td style="text-align: right;">163,357</td> <td style="text-align: right;">32,671</td> </tr> <tr> <td style="padding-left: 20px;">e.</td> <td style="text-align: center;">2017</td> <td style="text-align: right;">369,213</td> <td style="text-align: right;">73,843</td> </tr> <tr> <td style="padding-left: 20px;">f.</td> <td style="text-align: center;">Total</td> <td></td> <td style="text-align: right; border-top: 1px solid black;">\$ 287,496</td> </tr> </tbody> </table>		Fiscal Year Ending June 30,	Excess Return	Recognized Amount	a.	2021	\$ 1,330,544	\$ 266,109	b.	2020	(385,418)	(77,084)	c.	2019	(40,218)	(8,044)	d.	2018	163,357	32,671	e.	2017	369,213	73,843	f.	Total		\$ 287,496
	Fiscal Year Ending June 30,	Excess Return	Recognized Amount																										
a.	2021	\$ 1,330,544	\$ 266,109																										
b.	2020	(385,418)	(77,084)																										
c.	2019	(40,218)	(8,044)																										
d.	2018	163,357	32,671																										
e.	2017	369,213	73,843																										
f.	Total		\$ 287,496																										
10. Actuarial value of assets as of June 30, 2021 (Item 1. + Item 3.d. + Item 7.+ Item 9.f.)	\$ 7,715,883																												
11. Ratio of actuarial value to market value	90.1%																												
12. Estimated annual return on actuarial value of assets	10.1%																												

\* Amounts may not add due to rounding



**Development of Actuarial Value of Assets**  
**Hazardous Members Retirement**  
(Dollar amounts expressed in thousands)\*

Year Ending	June 30, 2021																												
1. Actuarial value of assets at beginning of year	\$ 2,447,885																												
2. Market value of assets at beginning of year	\$ 2,379,704																												
3. Net new investments																													
a. Contributions	\$ 234,573																												
b. Benefit payments	(294,662)																												
c. Administrative expenses	(1,848)																												
d. Subtotal	\$ (61,937)																												
4. Market value of assets at end of year	\$ 2,914,408																												
5. Net earnings (Item 4. - Item 2. - Item 3.d.)	\$ 596,642																												
6. Assumed investment return rate for fiscal year	6.25%																												
7. Expected return for immediate recognition	\$ 146,796																												
8. Excess return for phased recognition	\$ 449,846																												
9. Phased-in recognition, 20% of excess return on assets for prior years:																													
	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="text-align: center; border-bottom: 1px solid black;">Fiscal Year Ending June 30,</th> <th style="text-align: center; border-bottom: 1px solid black;">Excess Return</th> <th style="text-align: center; border-bottom: 1px solid black;">Recognized Amount</th> </tr> </thead> <tbody> <tr> <td style="padding-left: 20px;">a.</td> <td style="text-align: center;">2021</td> <td style="text-align: right;">\$ 449,846</td> <td style="text-align: right;">\$ 89,969</td> </tr> <tr> <td style="padding-left: 20px;">b.</td> <td style="text-align: center;">2020</td> <td style="text-align: right;">(133,383)</td> <td style="text-align: right;">(26,677)</td> </tr> <tr> <td style="padding-left: 20px;">c.</td> <td style="text-align: center;">2019</td> <td style="text-align: right;">(12,449)</td> <td style="text-align: right;">(2,490)</td> </tr> <tr> <td style="padding-left: 20px;">d.</td> <td style="text-align: center;">2018</td> <td style="text-align: right;">54,598</td> <td style="text-align: right;">10,920</td> </tr> <tr> <td style="padding-left: 20px;">e.</td> <td style="text-align: center;">2017</td> <td style="text-align: right;">120,774</td> <td style="text-align: right;">24,155</td> </tr> <tr> <td style="padding-left: 20px;">f.</td> <td style="text-align: center;">Total</td> <td></td> <td style="text-align: right; border-top: 1px solid black;">\$ 95,877</td> </tr> </tbody> </table>		Fiscal Year Ending June 30,	Excess Return	Recognized Amount	a.	2021	\$ 449,846	\$ 89,969	b.	2020	(133,383)	(26,677)	c.	2019	(12,449)	(2,490)	d.	2018	54,598	10,920	e.	2017	120,774	24,155	f.	Total		\$ 95,877
	Fiscal Year Ending June 30,	Excess Return	Recognized Amount																										
a.	2021	\$ 449,846	\$ 89,969																										
b.	2020	(133,383)	(26,677)																										
c.	2019	(12,449)	(2,490)																										
d.	2018	54,598	10,920																										
e.	2017	120,774	24,155																										
f.	Total		\$ 95,877																										
10. Actuarial value of assets as of June 30, 2021 (Item 1. + Item 3.d. + Item 7.+ Item 9.f.)	\$ 2,628,621																												
11. Ratio of actuarial value to market value	90.2%																												
12. Estimated annual return on actuarial value of assets	10.0%																												

\* Amounts may not add due to rounding



**Schedule of Funding Progress**  
**Retirement Benefits**  
(Dollar amounts expressed in thousands)

June 30, (1)	Actuarial Value of Assets (AVA) (2)	Actuarial Accrued Liability (AAL) (3)	Unfunded Actuarial Accrued Liability (UAAL) (3) - (2) (4)	Funded Ratio (2)/(3) (5)	Annual Covered Payroll (6)	UAAL as % of Payroll (4)/(6) (7)
<b>Non-Hazardous Members</b>						
2012	\$ 5,547,236	\$ 9,139,568	\$ 3,592,332	60.7%	\$ 2,236,546	160.6%
2013	5,637,094	9,378,876	3,741,782	60.1%	2,236,277	167.3%
2014	6,117,134	9,772,523	3,655,389	62.6%	2,272,270	160.9%
2015	6,474,849	10,740,325	4,265,476	60.3%	2,296,716	185.7%
2016	6,535,372	11,076,457	4,541,085	59.0%	2,352,762	193.0%
2017	6,764,873	12,803,510	6,038,637	52.8%	2,452,407	246.2%
2018	6,950,225	13,191,505	6,241,280	52.7%	2,466,801	253.0%
2019	7,049,527	14,356,113	7,306,586	49.1%	2,521,860	289.7%
2020	7,220,607	14,610,868	7,390,261	49.4%	2,565,391	288.1%
2021	7,715,883	14,894,906	7,179,023	51.8%	2,528,735	283.9%
<b>Hazardous Members</b>						
2012	\$ 1,747,379	\$ 3,009,992	\$ 1,262,613	58.1%	\$ 464,229	272.0%
2013	1,801,691	3,124,206	1,322,515	57.7%	461,673	286.5%
2014	1,967,640	3,288,826	1,321,186	59.8%	479,164	275.7%
2015	2,096,783	3,613,308	1,516,525	58.0%	483,641	313.6%
2016	2,139,119	3,704,456	1,565,337	57.7%	492,851	317.6%
2017	2,238,320	4,649,047	2,410,727	48.1%	541,633	445.1%
2018	2,321,721	4,792,548	2,470,827	48.4%	533,618	463.0%
2019	2,375,106	5,245,365	2,870,259	45.3%	559,353	513.1%
2020	2,447,885	5,431,299	2,983,414	45.1%	568,558	524.7%
2021	2,628,621	5,629,458	3,000,837	46.7%	578,355	518.9%
<b>Total CERS Members</b>						
2012	\$ 7,294,615	\$ 12,149,560	\$ 4,854,945	60.0%	\$ 2,700,775	179.8%
2013	7,438,785	12,503,082	5,064,297	59.5%	2,697,950	187.7%
2014	8,084,774	13,061,349	4,976,575	61.9%	2,751,434	180.9%
2015	8,571,632	14,353,633	5,782,001	59.7%	2,780,357	208.0%
2016	8,674,491	14,780,913	6,106,422	58.7%	2,845,613	214.6%
2017	9,003,193	17,452,557	8,449,364	51.6%	2,994,040	282.2%
2018	9,271,946	17,984,053	8,712,107	51.6%	3,000,419	290.4%
2019	9,424,633	19,601,478	10,176,845	48.1%	3,081,213	330.3%
2020	9,668,492	20,042,167	10,373,675	48.2%	3,133,949	331.0%
2021	10,344,504	20,524,364	10,179,860	50.4%	3,107,090	327.6%



## 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:

	Non-Hazardous	Hazardous
Valuation date:	June 30, 2021	June 30, 2021
Actuarial cost method:	Entry Age Normal	Entry Age Normal
Amortization method:	Level percentage of payroll (2% payroll growth assumed)	Level percentage of payroll (2% 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	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	5-Year Smoothed Market
Actuarial assumptions:		
Investment rate of return	6.25%	6.25%
Projected salary increases	3.30% to 10.30% (varies by service)	3.55% to 19.05% (varies by service)
Inflation	2.30%	2.30%
Post-retirement benefit adjustments	0.00%	0.00%
Retiree Mortality	System-specific mortality table based on mortality experience from 2013-2018, projected with the ultimate rates from MP-2014 mortality improvement scale using a base year of 2019.	System-specific mortality table based on mortality experience from 2013-2018, projected with the ultimate rates from MP-2014 mortality improvement scale using a base year of 2019.



**Solvency Test**  
**Retirement Benefits**  
(Dollar amounts expressed in thousands)

June 30, (1)	Actuarial Accrued Liability				Portion of Aggregate Accrued Liabilities Covered by Assets		
	Active Member Contributions (2)	Retired Members & Beneficiaries (3)	Active Members (Employer Financed) (4)	Valuation Assets (5)	Active (6)	Retired (7)	ER Financed (8)
<b>Non-Hazardous Members</b>							
2012	\$ 1,117,549	\$ 5,416,933	\$ 2,605,085	\$ 5,547,236	100.0%	81.8%	0.0%
2013	1,149,611	5,638,371	2,590,894	5,637,094	100.0%	79.6%	0.0%
2014	1,204,383	5,873,279	2,694,860	6,117,134	100.0%	83.6%	0.0%
2015	1,216,585	6,489,863	3,033,878	6,474,849	100.0%	81.0%	0.0%
2016	1,231,027	6,785,530	3,059,900	6,535,372	100.0%	78.2%	0.0%
2017	1,277,432	7,731,682	3,794,396	6,764,873	100.0%	71.0%	0.0%
2018	1,269,287	8,196,719	3,725,499	6,950,225	100.0%	69.3%	0.0%
2019	1,280,679	8,905,544	4,169,890	7,049,527	100.0%	64.8%	0.0%
2020	1,312,554	9,088,237	4,210,077	7,220,607	100.0%	65.0%	0.0%
2021	1,324,826	9,397,968	4,172,112	7,715,883	100.0%	68.0%	0.0%
<b>Hazardous Members</b>							
2012	\$ 381,672	\$ 1,889,884	\$ 738,435	\$ 1,747,379	100.0%	72.3%	0.0%
2013	390,471	1,988,030	745,705	1,801,691	100.0%	71.0%	0.0%
2014	415,070	2,077,517	796,239	1,967,640	100.0%	74.7%	0.0%
2015	422,359	2,297,703	893,246	2,096,783	100.0%	72.9%	0.0%
2016	428,713	2,388,712	887,031	2,139,119	100.0%	71.6%	0.0%
2017	458,808	2,910,601	1,279,638	2,238,320	100.0%	61.1%	0.0%
2018	442,637	3,151,058	1,198,853	2,321,721	100.0%	59.6%	0.0%
2019	458,559	3,399,954	1,386,852	2,375,106	100.0%	56.4%	0.0%
2020	454,801	3,606,091	1,370,407	2,447,885	100.0%	55.3%	0.0%
2021	457,391	3,777,313	1,394,754	2,628,621	100.0%	57.5%	0.0%



## **INSURANCE BENEFITS**

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### **ACTUARIAL TABLES**

## Development of Unfunded Actuarial Accrued Liability Insurance Benefits

(Dollar amounts expressed in thousands)

	June 30, 2021	
	Non-Hazardous (1)	Hazardous (2)
1. Projected payroll of active members	\$ 2,528,735	\$ 578,355
2. Present value of future pay	\$ 18,993,123	\$ 5,098,809
3. Normal cost rate		
a. Total normal cost rate	3.07%	4.83%
b. Less: member contribution rate	-0.55%	-0.55%
c. Employer normal cost rate	<u>2.52%</u>	<u>4.28%</u>
4. Actuarial accrued liability for active members		
a. Present value of future benefits	\$ 2,155,414	\$ 722,989
b. Less: present value of future normal costs	<u>(540,664)</u>	<u>(189,313)</u>
c. Actuarial accrued liability	\$ 1,614,750	\$ 533,676
5. Total actuarial accrued liability		
a. Retirees and beneficiaries	\$ 1,644,607	\$ 1,196,333
b. Inactive members	191,127	21,194
c. Active members (Item 4c)	<u>1,614,750</u>	<u>533,676</u>
d. Total	\$ 3,450,484	\$ 1,751,203
6. Actuarial value of assets	\$ 2,947,312	\$ 1,475,635
7. Unfunded actuarial accrued liability (UAAL) (Item 5d - Item 6)	\$ 503,172	\$ 275,568
8. Funded Ratio	85.4%	84.3%



**Development of Actuarially Determined Contribution Rate  
Insurance Benefits**

	June 30, 2021	
	Non-Hazardous (1)	Hazardous (2)
1. Total normal cost rate	3.07%	4.83%
2. Less: member contribution rate	<u>-0.55%</u>	<u>-0.55%</u>
3. Total employer normal cost rate	2.52%	4.28%
4. Administrative expenses	<u>0.04%</u>	<u>0.09%</u>
5. Net employer normal cost rate	2.56%	4.37%
6. UAAL amortization contribution rate	<u>0.83%</u>	<u>2.41%</u>
7. Total calculated employer contribution	3.39%	6.78%

**Actuarial Balance Sheet**  
**Non-Hazardous Members Insurance**  
(Dollar amounts expressed in thousands)

	<u>June 30, 2021</u>	<u>June 30, 2020</u>
	(1)	(2)
1. Assets - Present and Expected Future Resources		
a. Current assets (actuarial value)	\$ 2,947,312	\$ 2,661,351
b. Present value of future member contributions	\$ 123,783	\$ 118,827
c. Present value of future employer contributions		
i. Normal cost contributions	\$ 416,881	\$ 451,657
ii. Unfunded accrued liability contributions	503,172	730,734
iii. Total future employer contributions	<u>\$ 920,053</u>	<u>\$ 1,182,391</u>
d. Total assets	\$ 3,991,148	\$ 3,962,569
2. Liabilities - Present Value of Expected Future Benefit Payments		
a. Active members		
i. Present value of future normal costs	\$ 540,664	\$ 570,484
ii. Accrued liability	1,614,750	1,645,926
iii. Total present value of future benefits	<u>\$ 2,155,414</u>	<u>\$ 2,216,410</u>
b. Present value of benefits payable on account of current retired members and beneficiaries	\$ 1,644,607	\$ 1,562,540
c. Present value of benefits payable on account of current inactive members	\$ 191,127	\$ 183,619
d. Total liabilities	\$ 3,991,148	\$ 3,962,569



**Actuarial Balance Sheet**  
**Hazardous Members Insurance**  
(Dollar amounts expressed in thousands)

	June 30, 2021	June 30, 2020
	(1)	(2)
1. Assets - Present and Expected Future Resources		
a. Current assets (actuarial value)	\$ 1,475,635	\$ 1,362,028
b. Present value of future member contributions	\$ 38,017	\$ 34,978
c. Present value of future employer contributions		
i. Normal cost contributions	\$ 151,296	\$ 161,722
ii. Unfunded accrued liability contributions	275,568	378,943
iii. Total future employer contributions	\$ 426,864	\$ 540,665
d. Total assets	\$ 1,940,516	\$ 1,937,671
2. Liabilities - Present Value of Expected Future Benefit Payments		
a. Active members		
i. Present value of future normal costs	\$ 189,313	\$ 196,700
ii. Accrued liability	533,676	586,582
iii. Total present value of future benefits	\$ 722,989	\$ 783,282
b. Present value of benefits payable on account of current retired members and beneficiaries	\$ 1,196,333	\$ 1,133,807
c. Present value of benefits payable on account of current inactive members	\$ 21,194	\$ 20,582
d. Total liabilities	\$ 1,940,516	\$ 1,937,671



## Reconciliation of Insurance Net Assets

(Dollar amounts expressed in thousands)<sup>1</sup>

	Year Ending	
	June 30, 2021	June 30, 2021
	(1)	(2)
	<b>Non-Hazardous</b>	<b>Hazardous</b>
1. Value of assets at beginning of year	\$ 2,581,613	\$ 1,321,117
2. Revenue for the year		
a. Contributions		
i. Member contributions	\$ 13,613	\$ 3,098
ii. Employer contributions	124,697	58,451
iii. Other contributions (less 401h)	5,206	1,348
iv. Total	\$ 143,517	\$ 62,897
b. Income		
i. Interest, dividends, and other income	\$ 73,643	\$ 38,313
ii. Investment expenses	(32,634)	(18,029)
iii. Net	\$ 41,009	\$ 20,284
c. Net realized and unrealized gains (losses)	600,076	306,622
d. Total revenue	\$ 784,602	\$ 389,802
3. Expenditures for the year		
a. Disbursements		
i. Refunds	\$ 0	\$ 0
ii. Healthcare premium subsidies	136,263	85,152
iii. Other benefit payments <sup>2</sup>	(17,772)	(2,584)
iv. Transfers to other systems	0	0
v. Total	\$ 118,491	\$ 82,568
b. Administrative expenses and depreciation	922	528
c. Total expenditures	\$ 119,413	\$ 83,095
4. Increase in net assets (Item 2. - Item 3.)	\$ 665,188	\$ 306,707
5. Value of assets at end of year (Item 1. + Item 4.)	\$ 3,246,801	\$ 1,627,824
6. Net external cash flow		
a. Dollar amount	\$ 24,103	\$ (20,199)
b. Percentage of market value	0.8%	-1.4%
7. Estimated annual return on net assets	24.7%	24.9%

<sup>1</sup> Amounts may not add due to rounding and include 401h assets

<sup>2</sup> Benefit payments have been offset by Medicare Drug Reimbursements, Insurance Premiums, and Humana Gain Share Payments



**Development of Actuarial Value of Assets**  
**Non-Hazardous Members Insurance**  
(Dollar amounts expressed in thousands)\*

Year Ending	June 30, 2021																												
1. Actuarial value of assets at beginning of year	\$ 2,661,351																												
2. Market value of assets at beginning of year	\$ 2,581,613																												
3. Net new investments																													
a. Contributions	\$ 143,517																												
b. Benefit payments	(118,491)																												
c. Administrative expenses	(922)																												
d. Subtotal	\$ 24,103																												
4. Market value of assets at end of year	\$ 3,246,801																												
5. Net earnings (Item 4. - Item 2. - Item 3.d.)	\$ 641,085																												
6. Assumed investment return rate for fiscal year	6.25%																												
7. Expected return for immediate recognition	\$ 162,104																												
8. Excess return for phased recognition	\$ 478,981																												
9. Phased-in recognition, 20% of excess return on assets for prior years:																													
	<table border="0" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="text-align: center; border-bottom: 1px solid black;">Fiscal Year Ending June 30,</th> <th style="text-align: center; border-bottom: 1px solid black;">Excess Return</th> <th style="text-align: center; border-bottom: 1px solid black;">Recognized Amount</th> </tr> </thead> <tbody> <tr> <td style="padding-left: 20px;">a.</td> <td style="text-align: center;">2021</td> <td style="text-align: right;">\$ 478,981</td> <td style="text-align: right;">\$ 95,796</td> </tr> <tr> <td style="padding-left: 20px;">b.</td> <td style="text-align: center;">2020</td> <td style="text-align: right;">(151,527)</td> <td style="text-align: right;">(30,305)</td> </tr> <tr> <td style="padding-left: 20px;">c.</td> <td style="text-align: center;">2019</td> <td style="text-align: right;">(13,849)</td> <td style="text-align: right;">(2,770)</td> </tr> <tr> <td style="padding-left: 20px;">d.</td> <td style="text-align: center;">2018</td> <td style="text-align: right;">63,800</td> <td style="text-align: right;">12,760</td> </tr> <tr> <td style="padding-left: 20px;">e.</td> <td style="text-align: center;">2017</td> <td style="text-align: right;">121,364</td> <td style="text-align: right;">24,273</td> </tr> <tr> <td style="padding-left: 20px;">f.</td> <td style="text-align: center;">Total</td> <td></td> <td style="text-align: right; border-top: 1px solid black;">\$ 99,754</td> </tr> </tbody> </table>		Fiscal Year Ending June 30,	Excess Return	Recognized Amount	a.	2021	\$ 478,981	\$ 95,796	b.	2020	(151,527)	(30,305)	c.	2019	(13,849)	(2,770)	d.	2018	63,800	12,760	e.	2017	121,364	24,273	f.	Total		\$ 99,754
	Fiscal Year Ending June 30,	Excess Return	Recognized Amount																										
a.	2021	\$ 478,981	\$ 95,796																										
b.	2020	(151,527)	(30,305)																										
c.	2019	(13,849)	(2,770)																										
d.	2018	63,800	12,760																										
e.	2017	121,364	24,273																										
f.	Total		\$ 99,754																										
10. Actuarial value of assets as of June 30, 2021 (Item 1. + Item 3.d. + Item 7.+ Item 9.f.)	\$ 2,947,312																												
11. Ratio of actuarial value to market value	90.8%																												
12. Estimated annual return on actuarial value of assets	9.8%																												

\* Amounts may not add due to rounding





**Development of Actuarial Value of Assets**  
**Hazardous Members Insurance**  
(Dollar amounts expressed in thousands)\*

Year Ending	June 30, 2021																												
1. Actuarial value of assets at beginning of year	\$ 1,362,028																												
2. Market value of assets at beginning of year	\$ 1,321,117																												
3. Net new investments																													
a. Contributions	\$ 62,897																												
b. Benefit payments	(82,568)																												
c. Administrative expenses	(528)																												
d. Subtotal	\$ (20,199)																												
4. Market value of assets at end of year	\$ 1,627,824																												
5. Net earnings (Item 4. - Item 2. - Item 3.d.)	\$ 326,906																												
6. Assumed investment return rate for fiscal year	6.25%																												
7. Expected return for immediate recognition	\$ 81,939																												
8. Excess return for phased recognition	\$ 244,967																												
9. Phased-in recognition, 20% of excess return on assets for prior years:																													
	<table style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 5%;"></th> <th style="text-align: center;"><u>Fiscal Year</u> <u>Ending June 30,</u></th> <th style="text-align: center;"><u>Excess</u> <u>Return</u></th> <th style="text-align: center;"><u>Recognized</u> <u>Amount</u></th> </tr> </thead> <tbody> <tr> <td style="padding-left: 20px;">a.</td> <td style="text-align: center;">2021</td> <td style="text-align: right;">\$ 244,967</td> <td style="text-align: right;">\$ 48,993</td> </tr> <tr> <td style="padding-left: 20px;">b.</td> <td style="text-align: center;">2020</td> <td style="text-align: right;">(80,794)</td> <td style="text-align: right;">(16,159)</td> </tr> <tr> <td style="padding-left: 20px;">c.</td> <td style="text-align: center;">2019</td> <td style="text-align: right;">(6,320)</td> <td style="text-align: right;">(1,264)</td> </tr> <tr> <td style="padding-left: 20px;">d.</td> <td style="text-align: center;">2018</td> <td style="text-align: right;">36,099</td> <td style="text-align: right;">7,220</td> </tr> <tr> <td style="padding-left: 20px;">e.</td> <td style="text-align: center;">2017</td> <td style="text-align: right;">65,383</td> <td style="text-align: right;">13,077</td> </tr> <tr> <td style="padding-left: 20px;">f.</td> <td style="text-align: center;">Total</td> <td></td> <td style="text-align: right; border-top: 1px solid black;">\$ 51,867</td> </tr> </tbody> </table>		<u>Fiscal Year</u> <u>Ending June 30,</u>	<u>Excess</u> <u>Return</u>	<u>Recognized</u> <u>Amount</u>	a.	2021	\$ 244,967	\$ 48,993	b.	2020	(80,794)	(16,159)	c.	2019	(6,320)	(1,264)	d.	2018	36,099	7,220	e.	2017	65,383	13,077	f.	Total		\$ 51,867
	<u>Fiscal Year</u> <u>Ending June 30,</u>	<u>Excess</u> <u>Return</u>	<u>Recognized</u> <u>Amount</u>																										
a.	2021	\$ 244,967	\$ 48,993																										
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f.	Total		\$ 51,867																										
10. Actuarial value of assets as of June 30, 2021 (Item 1. + Item 3.d. + Item 7.+ Item 9.f.)	\$ 1,475,635																												
11. Ratio of actuarial value to market value	90.7%																												
12. Estimated annual return on actuarial value of assets	9.9%																												

\* Amounts may not add due to rounding



**Schedule of Funding Progress**  
**Insurance Benefits**  
(Dollar amounts expressed in thousands)

June 30, (1)	Actuarial Value of Assets (AVA) (2)	Actuarial Accrued Liability (AAL) (3)	Unfunded Actuarial Accrued Liability (UAAL) (3) - (2) (4)	Funded Ratio (2)/(3) (5)	Annual Covered Payroll (6)	UAAL as % of Payroll (4)/(6) (7)
<b>Non-Hazardous Members</b>						
2012	\$ 1,512,854	\$ 2,370,771	\$ 857,917	63.8%	\$ 2,236,546	38.4%
2013	1,628,244	2,443,894	815,650	66.6%	2,236,277	36.5%
2014	1,831,199	2,616,915	785,716	70.0%	2,272,270	34.6%
2015	1,997,456	2,907,827	910,371	68.7%	2,296,716	39.6%
2016	2,079,811	2,988,121	908,310	69.6%	2,352,762	38.6%
2017	2,227,401	3,355,151	1,127,750	66.4%	2,452,407	46.0%
2018	2,371,430	3,092,624	721,194	76.7%	2,466,801	29.2%
2019	2,523,249	3,567,947	1,044,698	70.7%	2,521,860	41.4%
2020	2,661,351	3,392,085	730,734	78.5%	2,565,391	28.5%
2021	2,947,312	3,450,484	503,172	85.4%	2,528,735	19.9%
<b>Hazardous Members</b>						
2012	\$ 829,041	\$ 1,364,843	\$ 535,802	60.7%	\$ 464,229	115.4%
2013	892,774	1,437,333	544,559	62.1%	461,673	118.0%
2014	997,733	1,493,864	496,131	66.8%	479,164	103.5%
2015	1,087,707	1,504,015	416,308	72.3%	483,641	86.1%
2016	1,135,784	1,558,818	423,034	72.9%	492,851	85.8%
2017	1,196,780	1,788,433	591,653	66.9%	541,633	109.2%
2018	1,256,306	1,684,028	427,722	74.6%	533,618	80.2%
2019	1,313,659	1,732,879	419,220	75.8%	559,353	74.9%
2020	1,362,028	1,740,971	378,943	78.2%	568,558	66.6%
2021	1,475,635	1,751,203	275,568	84.3%	578,355	47.6%
<b>Total CERS Members</b>						
2012	\$ 2,341,895	\$ 3,735,614	\$ 1,393,719	62.7%	\$ 2,700,775	51.6%
2013	2,521,018	3,881,227	1,360,209	65.0%	2,697,950	50.4%
2014	2,828,932	4,110,779	1,281,847	68.8%	2,751,434	46.6%
2015	3,085,163	4,411,842	1,326,679	69.9%	2,780,357	47.7%
2016	3,215,595	4,546,939	1,331,344	70.7%	2,845,613	46.8%
2017	3,424,181	5,143,584	1,719,403	66.6%	2,994,040	57.4%
2018	3,627,736	4,776,652	1,148,916	75.9%	3,000,419	38.3%
2019	3,836,908	5,300,826	1,463,918	72.4%	3,081,213	47.5%
2020	4,023,379	5,133,056	1,109,677	78.4%	3,133,949	35.4%
2021	4,422,947	5,201,687	778,740	85.0%	3,107,090	25.1%



**Solvency Test**  
**Insurance Benefits**  
(Dollar amounts expressed in thousands)

June 30, (1)	Actuarial Accrued Liability				Portion of Aggregate Accrued Liabilities Covered by Assets		
	Active Member Contributions (2)	Retired Members & Beneficiaries (3)	Active Members (Employer Financed) (4)	Valuation Assets (5)	Active (6)	Retired (7)	ER Financed (8)
<b>Non-Hazardous Members</b>							
2012	\$ -	\$ 1,146,908	\$ 1,223,864	\$ 1,512,854	100.0%	100.0%	29.9%
2013	-	1,205,599	1,238,295	1,628,244	100.0%	100.0%	34.1%
2014	-	1,318,183	1,298,732	1,831,199	100.0%	100.0%	39.5%
2015	-	1,372,597	1,535,231	1,997,456	100.0%	100.0%	40.7%
2016	-	1,484,937	1,503,184	2,079,811	100.0%	100.0%	39.6%
2017	-	1,603,438	1,751,713	2,227,401	100.0%	100.0%	35.6%
2018	-	1,525,323	1,567,301	2,371,430	100.0%	100.0%	54.0%
2019	-	1,830,692	1,737,255	2,523,249	100.0%	100.0%	39.9%
2020	-	1,746,159	1,645,926	2,661,351	100.0%	100.0%	55.6%
2021	-	1,835,734	1,614,750	2,947,312	100.0%	100.0%	68.8%
<b>Hazardous Members</b>							
2012	\$ -	\$ 575,099	\$ 789,744	\$ 829,041	100.0%	100.0%	32.2%
2013	-	660,955	776,377	892,774	100.0%	100.0%	29.9%
2014	-	700,312	793,553	997,733	100.0%	100.0%	37.5%
2015	-	790,714	713,301	1,087,707	100.0%	100.0%	41.6%
2016	-	879,360	679,458	1,135,784	100.0%	100.0%	37.7%
2017	-	994,764	793,669	1,196,780	100.0%	100.0%	25.5%
2018	-	1,001,717	682,311	1,256,306	100.0%	100.0%	37.3%
2019	-	1,072,861	660,018	1,313,659	100.0%	100.0%	36.5%
2020	-	1,154,389	586,582	1,362,028	100.0%	100.0%	35.4%
2021	-	1,217,527	533,676	1,475,635	100.0%	100.0%	48.4%



## SECTION 4

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### AMORTIZATION BASES

## Amortization of Unfunded Liability

### Non-Hazardous Members Retirement

Valuation Year Base Established	Original Amortization Base	Remaining at June 30, 2021	Payments for FYE 2023	Funding Period at June 30, 2021
June 30, 2019	\$ 7,306,586	\$ 7,443,201	\$ 459,563	28
June 30, 2020	(43,634)	69,417	5,410	19
June 30, 2021	(333,595)	(333,595)	(24,003)	20
Total		\$ 7,179,023	\$ 440,970	
Projected Payroll for FYE 2023			\$ 2,579,309	
Amortization Payments as a Percentage of Payroll			17.10%	

### Hazardous Members Retirement

Valuation Year Base Established	Original Amortization Base	Remaining at June 30, 2021	Payments for FYE 2023	Funding Period at June 30, 2021
June 30, 2019	\$ 2,870,259	\$ 2,945,514	\$ 181,864	28
June 30, 2020	41,583	112,660	8,781	19
June 30, 2021	(57,337)	(57,337)	(1,272)	20
Total		\$ 3,000,837	\$ 189,373	
Projected Payroll for FYE 2023			\$ 589,922	
Amortization Payments as a Percentage of Payroll			32.10%	

**Note:**

Budgeted contribution rates for FYE 2022 were known at the time of the June 30, 2021 Valuation. Amortization bases established at this valuation date were adjusted accordingly.

## Amortization of Unfunded Liability

### Non-Hazardous Members Insurance

Valuation Year Base Established	Original Amortization Base	Remaining at June 30, 2021	Payments for FYE 2023	Funding Period at June 30, 2021
June 30, 2019	\$ 1,044,698	\$ 1,064,711	\$ 65,738	28
June 30, 2020	(332,646)	(342,367)	(26,685)	19
June 30, 2021	(219,172)	(219,172)	(17,948)	20
Total		\$ 503,172	\$ 21,105	
Projected Payroll for FYE 2023			\$ 2,549,478	
Amortization Payments as a Percentage of Payroll			0.83%	

### Hazardous Members Insurance

Valuation Year Base Established	Original Amortization Base	Remaining at June 30, 2021	Payments for FYE 2023	Funding Period at June 30, 2021
June 30, 2019	\$ 419,220	\$ 422,550	\$ 26,089	28
June 30, 2020	(43,079)	(46,725)	(3,642)	19
June 30, 2021	(100,257)	(100,257)	(8,376)	20
Total		\$ 275,568	\$ 14,071	
Projected Payroll for FYE 2023			\$ 584,902	
Amortization Payments as a Percentage of Payroll			2.41%	

**Note:**

Budgeted contribution rates for FYE 2022 were known at the time of the June 30, 2021 Valuation. Amortization bases established at this valuation date were adjusted accordingly.

## SECTION 5

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### MEMBERSHIP INFORMATION

## Membership Tables

<u>TABLE NUMBER</u>	<u>PAGE</u>	<u>CONTENT OF TABLE</u>
23	44	SUMMARY OF MEMBERSHIP DATA
24	45	SUMMARY OF HISTORICAL ACTIVE MEMBERSHIP
25	46	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND SERVICE – NON-HAZARDOUS MEMBERS
26	47	DISTRIBUTION OF ACTIVE MEMBERS BY AGE AND SERVICE – HAZARDOUS MEMBERS
27	48	SCHEDULE OF ANNUITANTS BY AGE – NON-HAZARDOUS MEMBERS
28	49	SCHEDULE OF ANNUITANTS BY AGE – HAZARDOUS MEMBERS
29	50	SCHEDULE OF ANNUITANTS BY BENEFIT TYPE – NON-HAZARDOUS RETIREES
30	51	SCHEDULE OF ANNUITANTS BY BENEFIT TYPE – HAZARDOUS RETIREES
31	52	SCHEDULE OF ANNUITANTS BY BENEFIT TYPE – NON-HAZARDOUS BENEFICIARIES
32	53	SCHEDULE OF ANNUITANTS BY BENEFIT TYPE – HAZARDOUS BENEFICIARIES
33	54	SCHEDULE OF ANNUITANTS ADDED TO AND REMOVED FROM ROLLS



**Summary of Membership Data**  
(Total dollar amounts expressed in thousands)

	Non-Hazardous June 30, 2021 (1)	Hazardous June 30, 2021 (2)	Total June 30, 2021 (3)	Total June 30, 2020 (4)
1. Active members				
a. Males	28,622	8,186	36,808	37,793
b. Females	48,745	987	49,732	52,876
c. Total members	77,367	9,173	86,540	90,669
d. Total annualized prior year salaries	\$ 2,528,735	\$ 578,355	\$ 3,107,090	\$ 3,133,949
e. Average salary <sup>2</sup>	\$ 32,685	\$ 63,050	\$ 35,904	\$ 34,565
f. Average age	48.0	38.4	46.9	46.8
g. Average service	9.4	10.0	9.5	9.2
h. Member contributions with interest	\$ 1,324,826	\$ 457,391	\$ 1,782,217	\$ 1,767,355
i. Average contributions with interest <sup>2</sup>	\$ 17,124	\$ 49,863	\$ 20,594	\$ 19,492
2. Vested inactive members <sup>1</sup>				
a. Number	50,723	1,811	52,534	52,366
b. Total annual deferred benefits	\$ 82,739	\$ 8,570	\$ 91,309	\$ 87,591
c. Average annual deferred benefit <sup>2</sup>	\$ 1,631	\$ 4,732	\$ 1,738	\$ 1,673
d. Average age at the valuation date	53.5	46.3	53.3	52.7
3. Nonvested inactive members <sup>1</sup>				
a. Number	50,015	2,084	52,099	46,916
b. Total member contributions with interest	\$ 67,154	\$ 8,024	\$ 75,178	\$ 62,357
c. Average contributions with interest <sup>2</sup>	\$ 1,343	\$ 3,850	\$ 1,443	\$ 1,329
4. Service retirees				
a. Number	57,100	8,969	66,069	64,079
b. Total annual benefits	\$ 686,160	\$ 258,133	\$ 944,293	\$ 906,216
c. Average annual benefit <sup>2</sup>	\$ 12,017	\$ 28,781	\$ 14,293	\$ 14,142
d. Average age at the valuation date	70.9	62.4	69.8	69.6
5. Disabled retirees				
a. Number	3,971	578	4,549	4,593
b. Total annual benefits	\$ 46,151	\$ 9,773	\$ 55,924	\$ 56,049
c. Average annual benefit <sup>2</sup>	\$ 11,622	\$ 16,908	\$ 12,294	\$ 12,203
d. Average age at the valuation date	66.4	57.9	65.3	64.9
6. Beneficiaries				
a. Number	6,135	1,311	7,446	7,194
b. Total annual benefits	\$ 59,251	\$ 20,970	\$ 80,221	\$ 75,985
c. Average annual benefit <sup>2</sup>	\$ 9,658	\$ 15,995	\$ 10,774	\$ 10,562
d. Average age at the valuation date	68.4	59.4	66.8	66.5

<sup>1</sup> 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.

<sup>2</sup> Average dollar amounts shown are expressed to the dollar.



### Summary of Historical Active Membership

June 30, (1)	Active Members		Covered Payroll <sup>1</sup>		Average Annual Pay	
	Number (2)	Percent Increase /(Decrease) (3)	Amount in Thousands (4)	Percent Increase /(Decrease) (5)	Amount (6)	Percent Increase /(Decrease) (7)
<b>Non-Hazardous Members</b>						
2012	83,052		\$ 2,236,546		\$ 26,929	
2013	81,815	-1.5%	2,236,277	0.0%	27,333	1.5%
2014	81,115	-0.9%	2,272,270	1.6%	28,013	2.5%
2015	80,852	-0.3%	2,296,716	1.1%	28,406	1.4%
2016	80,664	-0.2%	2,352,762	2.4%	29,167	2.7%
2017	82,198	1.9%	2,452,407	4.2%	29,835	2.3%
2018	81,818	-0.5%	2,466,801	0.6%	30,150	1.1%
2019	81,506	-0.4%	2,521,860	2.2%	30,941	2.6%
2020	81,250	-0.3%	2,565,391	1.7%	31,574	2.0%
2021	77,367	-4.8%	2,528,735	-1.4%	32,685	3.5%
<b>Hazardous Members</b>						
2012	9,130		\$ 464,229		\$ 50,847	
2013	9,123	-0.1%	461,673	-0.6%	50,605	-0.5%
2014	9,194	0.8%	479,164	3.8%	52,117	3.0%
2015	9,172	-0.2%	483,641	0.9%	52,730	1.2%
2016	9,084	-1.0%	492,851	1.9%	54,255	2.9%
2017	9,495	4.5%	541,633	9.9%	57,044	5.1%
2018	9,263	-2.4%	533,618	-1.5%	57,607	1.0%
2019	9,474	2.3%	559,353	4.8%	59,041	2.5%
2020	9,419	-0.6%	568,558	1.6%	60,363	2.2%
2021	9,173	-2.6%	578,355	1.7%	63,050	4.5%

<sup>1</sup> 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**  
**Non-Hazardous Members**

Attained Age	Years of Credited Service												Total	
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over		
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	
Under 20	169 \$14,901	11 \$20,292	0 \$0	0 \$0	2 \$27,655	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	182 \$15,367
20-24	1,335 \$18,921	702 \$24,593	344 \$27,254	150 \$29,575	62 \$31,469	17 \$36,403	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	2,610 \$22,569
25-29	1,135 \$21,884	1,026 \$26,843	875 \$28,875	623 \$31,010	437 \$33,789	640 \$36,646	9 \$40,772	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	4,745 \$28,567
30-34	920 \$21,297	903 \$26,233	854 \$29,357	728 \$29,572	578 \$31,307	1,631 \$37,132	380 \$44,401	25 \$50,641	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	6,019 \$31,015
35-39	868 \$22,591	810 \$26,208	880 \$27,406	739 \$28,458	570 \$30,838	1,843 \$35,478	1,066 \$44,312	438 \$47,799	26 \$52,352	0 \$0	0 \$0	0 \$0	0 \$0	7,240 \$32,939
40-44	768 \$22,871	848 \$25,484	834 \$28,407	740 \$28,960	690 \$29,935	2,189 \$33,732	1,307 \$41,034	1,061 \$46,635	516 \$51,897	29 \$63,561	0 \$0	0 \$0	0 \$0	8,982 \$34,572
45-49	662 \$23,521	670 \$26,494	718 \$28,632	595 \$27,551	583 \$29,479	2,200 \$31,668	1,636 \$38,017	1,379 \$42,644	1,030 \$50,126	258 \$62,398	4 \$107,172	0 \$0	0 \$0	9,735 \$35,571
50-54	619 \$20,970	618 \$26,582	674 \$29,089	561 \$29,619	530 \$31,379	2,127 \$31,492	1,901 \$35,344	1,871 \$37,913	1,587 \$44,304	535 \$54,656	74 \$64,142	5 \$89,928	5 \$0	11,102 \$35,319
55-59	537 \$21,612	513 \$24,725	621 \$28,065	476 \$28,450	487 \$29,355	1,878 \$31,437	1,804 \$34,858	2,030 \$35,347	1,956 \$37,196	735 \$46,840	130 \$62,648	42 \$72,104	42 \$0	11,209 \$34,043
60-64	412 \$18,923	411 \$24,333	507 \$24,442	416 \$26,098	369 \$28,273	1,647 \$29,625	1,459 \$32,457	1,631 \$34,374	1,479 \$37,280	707 \$41,902	126 \$48,327	51 \$57,728	51 \$0	9,215 \$32,283
65 & Over	344 \$14,970	372 \$17,710	428 \$21,102	311 \$20,880	328 \$22,021	1,333 \$25,349	1,169 \$29,430	919 \$33,022	598 \$36,713	322 \$41,734	130 \$42,047	74 \$59,903	74 \$0	6,328 \$28,179
Total	7,769 \$20,915	6,884 \$25,422	6,735 \$27,696	5,339 \$28,404	4,636 \$29,954	15,505 \$32,385	10,731 \$36,542	9,354 \$38,442	7,192 \$41,703	2,586 \$48,211	464 \$53,609	172 \$63,110	172 \$0	77,367 \$32,685



**Distribution of Active Members by Age and by Years of Service**  
**Hazardous Members**

Attained Age	Years of Credited Service												Total	
	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over		
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	
Under 20	7 \$33,235	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	7 \$33,235
20-24	191 \$32,684	159 \$46,778	68 \$51,522	30 \$46,054	8 \$53,065	3 \$58,751	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	459 \$41,756
25-29	151 \$34,676	216 \$46,321	265 \$53,449	264 \$54,345	223 \$55,508	268 \$57,064	1 \$63,665	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1,388 \$51,504
30-34	88 \$35,416	103 \$45,068	141 \$52,352	170 \$55,002	161 \$56,033	846 \$61,886	171 \$66,806	3 \$63,218	0 \$0	0 \$0	0 \$0	0 \$0	0 \$0	1,683 \$57,921
35-39	54 \$36,946	70 \$49,057	67 \$52,823	57 \$52,276	89 \$58,521	515 \$63,088	635 \$70,203	233 \$72,743	4 \$88,355	0 \$0	0 \$0	0 \$0	0 \$0	1,724 \$64,691
40-44	21 \$33,595	30 \$53,262	25 \$48,726	35 \$50,830	43 \$55,721	220 \$62,309	392 \$70,481	609 \$74,925	155 \$88,389	12 \$101,911	0 \$0	0 \$0	0 \$0	1,542 \$71,067
45-49	18 \$36,324	23 \$42,865	21 \$46,910	16 \$47,097	16 \$46,845	105 \$56,600	198 \$67,841	372 \$73,400	251 \$87,479	73 \$94,092	3 \$117,889	0 \$0	0 \$0	1,096 \$72,981
50-54	10 \$25,140	12 \$51,652	11 \$61,100	12 \$50,724	20 \$42,582	72 \$56,693	142 \$66,077	232 \$68,593	158 \$83,604	52 \$91,816	12 \$117,286	12 \$121,140	1 \$70,701	734 \$70,701
55-59	3 \$38,928	2 \$64,034	2 \$60,932	7 \$42,569	9 \$49,066	28 \$50,824	76 \$69,473	103 \$73,385	48 \$72,168	29 \$87,389	12 \$94,796	3 \$118,640	3 \$70,993	322 \$70,993
60-64	3 \$36,131	3 \$36,812	7 \$50,639	5 \$42,100	1 \$77,209	14 \$56,555	45 \$64,133	37 \$64,879	18 \$70,834	6 \$78,974	5 \$97,197	3 \$102,120	3 \$64,493	147 \$64,493
65 & Over	2 \$32,876	0 \$0	1 \$53,888	2 \$44,479	2 \$46,442	7 \$54,826	19 \$52,773	21 \$64,383	8 \$106,012	6 \$79,624	0 \$0	3 \$95,288	3 \$65,517	71 \$65,517
Total	548 \$34,169	618 \$46,862	608 \$52,621	598 \$53,173	572 \$55,317	2,078 \$60,947	1,679 \$68,897	1,610 \$72,856	642 \$85,370	178 \$91,865	32 \$105,770	10 \$106,929	9,173 \$63,050	9,173 \$63,050



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

Current Age	Retirement		Disability		Survivors & Beneficiaries		Total	
	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	267	\$ 5,980	143	\$ 1,638	691	\$ 5,723	1,101	\$ 13,341
50 - 54	1,127	24,464	260	3,388	289	2,702	1,676	30,555
55 - 59	3,802	66,371	521	6,886	423	4,357	4,746	77,614
60 - 64	8,641	127,586	895	11,286	717	8,304	10,253	147,176
65 - 69	13,445	165,934	831	9,518	836	8,526	15,112	183,978
70 - 74	13,172	145,640	639	7,041	1,035	10,326	14,846	163,008
75 - 79	8,201	79,046	386	3,743	813	8,007	9,400	90,797
80 - 84	5,031	44,825	212	2,005	659	6,148	5,902	52,978
85 - 89	2,430	19,551	69	547	433	3,409	2,932	23,507
90 And Over	984	6,761	15	99	239	1,748	1,238	8,608
<b>Total</b>	<b>57,100</b>	<b>\$ 686,160</b>	<b>3,971</b>	<b>\$ 46,151</b>	<b>6,135</b>	<b>\$ 59,251</b>	<b>67,206</b>	<b>\$ 791,562</b>

\*Amounts may not add due to rounding



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

Current Age	Retirement		Disability		Survivors & Beneficiaries		Total	
	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	1,014	\$ 35,081	135	\$ 2,420	302	\$ 2,897	1,451	\$ 40,397
50 - 54	1,374	46,303	103	1,909	90	1,441	1,567	49,653
55 - 59	1,538	48,786	101	1,801	114	2,036	1,753	52,624
60 - 64	1,405	39,139	85	1,369	139	2,398	1,629	42,906
65 - 69	1,515	39,912	84	1,190	199	3,702	1,798	44,803
70 - 74	1,198	29,002	48	771	190	3,664	1,436	33,437
75 - 79	561	12,243	17	254	128	2,377	706	14,874
80 - 84	264	5,368	2	40	90	1,529	356	6,938
85 - 89	82	1,810	3	19	44	684	129	2,513
90 And Over	18	488	0	0	15	244	33	732
<b>Total</b>	<b>8,969</b>	<b>\$ 258,133</b>	<b>578</b>	<b>\$ 9,773</b>	<b>1,311</b>	<b>\$ 20,970</b>	<b>10,858</b>	<b>\$ 288,876</b>

\*Amounts may not add due to rounding



## Non-Hazardous Retired Lives Summary

Form of Payment (1)	Male Lives		Female Lives		Total	
	Number (2)	Monthly Benefit Amount (3)	Number (4)	Monthly Benefit Amount (5)	Number (6)	Monthly Benefit Amount (7)
Basic	6,338	\$ 6,793,492	23,646	\$ 18,054,563	29,984	\$ 24,848,056
Joint & Survivor:						
100% to Beneficiary	4,232	5,039,360	2,756	1,877,142	6,988	6,916,503
66 2/3% to Beneficiary	890	1,698,064	790	868,371	1,680	2,566,435
50% to Beneficiary	1,235	2,060,290	1,979	2,298,260	3,214	4,358,550
Pop-up Option	4,359	7,182,978	4,396	4,750,731	8,755	11,933,708
Social Security Option:						
Age 62 Basic	238	407,343	545	598,162	783	1,005,505
Age 62 Survivorship	588	1,050,560	375	387,593	963	1,438,153
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	0	0	0	0	0	0
10 Years Certain & Life	1,521	1,732,012	3,955	3,221,741	5,476	4,953,754
15 Years Certain & Life	690	746,060	1,106	843,082	1,796	1,589,142
20 Years Certain & Life	508	715,685	924	700,446	1,432	1,416,130
<b>Total:</b>	<b>20,599</b>	<b>\$ 27,425,844</b>	<b>40,472</b>	<b>\$ 33,600,092</b>	<b>61,071</b>	<b>\$ 61,025,936</b>



## Hazardous Retired Lives Summary

Form of Payment (1)	Male Lives		Female Lives		Total	
	Number (2)	Monthly Benefit Amount (3)	Number (4)	Monthly Benefit Amount (5)	Number (6)	Monthly Benefit Amount (7)
Basic	1,366	\$ 2,861,288	426	\$ 696,939	1,792	\$ 3,558,227
Joint & Survivor:						
100% to Beneficiary	1,439	3,145,146	72	105,127	1,511	3,250,273
66 2/3% to Beneficiary	378	974,334	28	66,004	406	1,040,338
50% to Beneficiary	524	1,322,979	64	145,764	588	1,468,743
Pop-up Option	3,771	10,006,659	185	412,829	3,956	10,419,488
Social Security Option:						
Age 62 Basic	110	169,584	13	14,217	123	183,801
Age 62 Survivorship	290	497,407	21	36,335	311	533,742
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	122	323,244	5	7,907	127	331,150
10 Years Certain & Life	267	580,080	77	147,113	344	727,193
15 Years Certain & Life	122	252,657	23	46,995	145	299,652
20 Years Certain & Life	211	458,601	33	54,232	244	512,833
<b>Total:</b>	<b>8,600</b>	<b>\$ 20,591,978</b>	<b>947</b>	<b>\$ 1,733,460</b>	<b>9,547</b>	<b>\$ 22,325,438</b>





### Non-Hazardous Beneficiary Lives Summary

Form of Payment (1)	Male Lives		Female Lives		Total	
	Number (2)	Monthly Benefit Amount (3)	Number (4)	Monthly Benefit Amount (5)	Number (6)	Monthly Benefit Amount (7)
Basic	31	\$ 11,498	68	\$ 63,543	99	\$ 75,041
Joint & Survivor:						
100% to Beneficiary	554	341,547	2,078	1,530,399	2,632	1,871,946
66 2/3% to Beneficiary	80	48,734	283	238,386	363	287,119
50% to Beneficiary	187	88,497	427	260,080	614	348,577
Pop-up Option	281	248,780	964	1,064,193	1,245	1,312,974
Social Security Option:						
Age 62 Basic	1	1,291	5	4,806	6	6,097
Age 62 Survivorship	33	21,893	173	218,966	206	240,858
Partial Deferred (Old Plan)	0	0	0	0	0	0
Widows Age 60	0	0	0	0	0	0
5 Years Certain	92	67,965	103	86,842	195	154,806
10 Years Certain	150	91,331	177	150,124	327	241,455
10 Years Certain & Life	72	54,811	114	102,466	186	157,277
15 Years Certain & Life	47	40,632	89	78,269	136	118,900
20 Years Certain & Life	45	32,921	81	89,640	126	122,561
<b>Total:</b>	<b>1,573</b>	<b>\$ 1,049,899</b>	<b>4,562</b>	<b>\$ 3,887,712</b>	<b>6,135</b>	<b>\$ 4,937,610</b>



### Hazardous Beneficiary Lives Summary

Form of Payment (1)	Male Lives		Female Lives		Total	
	Number (2)	Monthly Benefit Amount (3)	Number (4)	Monthly Benefit Amount (5)	Number (6)	Monthly Benefit Amount (7)
Basic	18	\$ 9,236	86	\$ 92,460	104	\$ 101,695
Joint & Survivor:						
100% to Beneficiary	30	21,773	350	452,502	380	474,275
66 2/3% to Beneficiary	1	329	62	94,397	63	94,726
50% to Beneficiary	13	10,304	113	103,522	126	113,826
Pop-up Option	48	31,252	382	681,451	430	712,703
Social Security Option:						
Age 62 Basic	0	0	2	1,641	2	1,641
Age 62 Survivorship	0	0	112	153,384	112	153,384
Partial Deferred (Old Plan)	0	0	0	0	0	0
Widows Age 60	0	0	2	1,469	2	1,469
5 Years Certain	5	9,540	4	3,561	9	13,101
10 Years Certain	16	18,542	24	24,509	40	43,052
10 Years Certain & Life	2	2,216	12	9,971	14	12,187
15 Years Certain & Life	5	2,097	6	7,373	11	9,470
20 Years Certain & Life	3	2,099	15	13,909	18	16,008
Total:	141	\$ 107,387	1,170	\$ 1,640,149	1,311	\$ 1,747,536



**Schedule of Retirees Added to And Removed from Rolls**  
(Dollar amounts except average allowance expressed in thousands)

Year Ended	Added to	Removed	Rolls End of the Year		% Increase in Annual Benefit	Average Annual Benefit
	Rolls	from Rolls	Number	Annual Benefits		
(1)	Number	Number	(4)	(5)	(6)	(7)
(1)	(2)	(3)	(4)	(5)	(6)	(7)
<b>Non-Hazardous</b>						
2012	3,300	1,207	45,304	\$ 515,008		\$ 11,368
2013	3,570	1,198	47,676	557,979	8.3%	11,704
2014	3,480	1,221	49,935	582,958	4.5%	11,674
2015	4,020	1,304	52,651	617,551	5.9%	11,729
2016	4,409	721	56,339	661,217	7.1%	11,736
2017	4,141	1,467	59,013	667,468	0.9%	11,311
2018	4,650	1,725	61,938	710,374	6.4%	11,469
2019	4,472	1,871	64,539	747,117	5.2%	11,576
2020	3,550	2,675	65,414	763,459	2.2%	11,671
2021	4,350	2,558	67,206	791,562	3.7%	11,778
<b>Hazardous</b>						
2012	483	73	6,878	\$ 173,221		\$ 25,185
2013	519	104	7,293	182,635	5.4%	25,042
2014	469	116	7,646	191,008	4.6%	24,981
2015	526	138	8,034	202,153	5.8%	25,162
2016	604	75	8,563	215,302	6.5%	25,143
2017	576	141	8,998	226,680	5.3%	25,192
2018	779	190	9,587	245,675	8.4%	25,626
2019	608	172	10,023	258,813	5.3%	25,822
2020	621	192	10,452	274,791	6.2%	26,291
2021	651	245	10,858	288,876	5.1%	26,605



## SECTION 6

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### 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 CERS'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 participating employers based on the employer's total payroll of employees who are earning benefits in CERS (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 CERS'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:

- **Ratio of market value of assets to payroll:** 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.
- **Ratio of actuarial accrued liability to payroll:** 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.
- **Percentage of Expected Contributions Actually Received:** 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 CERS Non-Hazardous and Hazardous Funds 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 funds, we have included this information for the insurance funds for completeness.

<b>CERS Non-Hazardous</b>										
	<b>Retirement Fund</b>					<b>Insurance Fund</b>				
	June 30,					June 30,				
	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017
Ratio of the market value of assets to total payroll	3.39	2.74	2.84	2.85	2.73	1.28	1.01	1.02	0.98	0.90
Ratio of actuarial accrued liability to payroll	5.89	5.70	5.69	5.35	5.22	1.36	1.32	1.41	1.25	1.37
Ratio of net cash flow to market value of assets	-2.9%	-2.7%	-3.5%	-3.5%	-3.7%	0.8%	0.1%	0.7%	0.0%	0.1%
Percentage of Expected Contribution Actually Received	76% <sup>1</sup>	82%	72%	96%	97%	88% <sup>1</sup>	102%	87%	101%	97%
Ratio of actives to retirees and beneficiaries	1.15	1.24	1.26	1.32	1.39					

<sup>1</sup> Expected contribution for FYE2021 based on the actuarially determined contribution rate of 29.24% from the June 30, 2019 valuation as amended by SB249, which reset the amortization period to 30 years, and expected compensation based on census data from the June 30, 2020 valuation.

<b>CERS Hazardous</b>										
	<b>Retirement Fund</b>					<b>Insurance Fund</b>				
	June 30,					June 30,				
	2021	2020	2019	2018	2017	2021	2020	2019	2018	2017
Ratio of the market value of assets to total payroll	5.04	4.19	4.32	4.40	4.10	2.81	2.32	2.40	2.40	2.20
Ratio of actuarial accrued liability to payroll	9.73	9.55	9.38	8.98	8.58	3.03	3.06	3.10	3.16	3.30
Ratio of net cash flow to market value of assets	-2.3%	-2.1%	-2.8%	-2.7%	-2.6%	-1.4%	-1.6%	-1.0%	-1.4%	-1.6%
Percentage of Expected Contribution Actually Received	71% <sup>1</sup>	80%	71%	100%	103%	102% <sup>1</sup>	104%	92%	104%	101%
Ratio of actives to retirees and beneficiaries	0.84	0.90	0.95	0.97	1.06					

<sup>1</sup> Expected contribution for FYE2021 based on the actuarially determined contribution rate of 51.88% from the June 30, 2019 valuation as amended by SB249, which reset the amortization period to 30 years, and expected compensation based on census data from the June 30, 2020 valuation.



## **APPENDIX A**

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### **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 County Employees Retirement System.

**In general, the assumptions and methods used in the valuation are based on the actuarial experience study for the five-year period ending June 30, 2018 and adopted by the Board in April 2019.**

*Investment return rate:*

Assumed annual rate of 6.25% net of investment expenses for the retirement funds and the insurance funds

*Price Inflation:*

Assumed annual rate of 2.30%

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

Assumed annual rate of 2.00%

*Rates of Annual Salary Increase:*

Assumed rates of annual salary increases are shown below.

Service Years	Annual Rates of Salary Increase					
	Merit & seniority		Price Inflation & Productivity		Total Increase	
	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous	Non-Hazardous	Hazardous
0	7.00%	15.50%	3.30%	3.55%	10.30%	19.05%
1	4.00%	4.00%	3.30%	3.55%	7.30%	7.55%
2	3.00%	2.00%	3.30%	3.55%	6.30%	5.55%
3	1.50%	1.25%	3.30%	3.55%	4.80%	4.80%
4	1.25%	1.00%	3.30%	3.55%	4.55%	4.55%
5	1.25%	1.00%	3.30%	3.55%	4.55%	4.55%
6	1.00%	1.00%	3.30%	3.55%	4.30%	4.55%
7	1.00%	0.50%	3.30%	3.55%	4.30%	4.05%
8	0.75%	0.50%	3.30%	3.55%	4.05%	4.05%
9	0.75%	0.00%	3.30%	3.55%	4.05%	3.55%
10	0.50%	0.00%	3.30%	3.55%	3.80%	3.55%
11	0.50%	0.00%	3.30%	3.55%	3.80%	3.55%
12	0.25%	0.00%	3.30%	3.55%	3.55%	3.55%
13	0.25%	0.00%	3.30%	3.55%	3.55%	3.55%
14	0.25%	0.00%	3.30%	3.55%	3.55%	3.55%
15 & Over	0.00%	0.00%	3.30%	3.55%	3.30%	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.

Age	Non-Hazardous				Service	Hazardous		
	Normal Retirement		Early Retirement <sup>1</sup>			Members participating before 9/1/2008 <sup>2</sup>	Members participating between 9/1/2008 and 1/1/2014 <sup>3</sup>	Members participating after 1/1/2014 <sup>3</sup>
	Male	Female	Male	Female				
Under 45	35.0%	27.0%			5	17.0%		
45	35.0%	27.0%			6	17.0%		
46	35.0%	27.0%			7	17.0%		
47	35.0%	27.0%			8	17.0%		
48	35.0%	27.0%			9	17.0%		
49	35.0%	27.0%			10	17.0%		
50	30.0%	27.0%			11	17.0%		
51	30.0%	27.0%			12	17.0%		
52	30.0%	27.0%			13	17.0%		
53	30.0%	27.0%			14	17.0%		
54	30.0%	27.0%			15	17.0%		
55	30.0%	27.0%	4.0%	5.0%	16	17.0%		
56	30.0%	27.0%	4.0%	5.0%	17	17.0%		
57	30.0%	27.0%	4.0%	5.0%	18	17.0%		
58	30.0%	27.0%	4.0%	5.0%	19	17.0%		
59	30.0%	27.0%	4.0%	5.0%	20	30.0%		
60	30.0%	27.0%	4.0%	8.0%	21	22.5%		
61	30.0%	27.0%	4.0%	9.0%	22	18.0%		
62	30.0%	40.0%	15.0%	20.0%	23	21.0%		
63	30.0%	35.0%	15.0%	18.0%	24	24.0%		
64	30.0%	30.0%	15.0%	16.0%	25	27.0%	21.6%	16.0%
65	30.0%	30.0%			26	30.0%	24.0%	16.0%
66	30.0%	27.0%			27	33.0%	26.4%	16.0%
67	30.0%	27.0%			28	36.0%	28.8%	16.0%
68	30.0%	27.0%			29	39.0%	31.2%	16.0%
69	30.0%	27.0%			30+	39.0%	31.2%	100.0%
70	30.0%	27.0%						
71	30.0%	27.0%						
72	30.0%	27.0%						
73	30.0%	27.0%						
74	30.0%	27.0%						
75	100.0%	100.0%						

<sup>1</sup> The annual rate of retirement is 11% for male members and 12% for female members with 25-26 years of service.

<sup>2</sup> The annual rate of retirement is 100% at age 62.

<sup>3</sup> The annual rate of retirement is 100% at age 60.

*Non-Hazardous System: For members hired after 7/1/2003, the rates shown above are multiplied by 80% if the member is under age 65 to reflect the different retiree health insurance benefit.*

*Hazardous System: 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 age 62 to reflect the different retiree health insurance benefit.*



*Disability rates:*

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

Age	Non-Hazardous		Hazardous	
	Male	Female	Male	Female
20	0.04%	0.04%	0.07%	0.07%
30	0.06%	0.06%	0.12%	0.12%
40	0.14%	0.14%	0.26%	0.26%
50	0.39%	0.39%	0.73%	0.73%
60	1.02%	1.02%	1.90%	1.90%

*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 Years	Annual Rates of Withdrawal	
	Non-Hazardous	Hazardous
1	20.00%	20.00%
2	15.58%	9.11%
3	12.48%	7.24%
4	10.66%	6.14%
5	9.37%	5.37%
6	8.37%	4.76%
7	7.56%	4.27%
8	6.87%	3.85%
9	6.27%	3.49%
10	5.74%	3.18%
11	5.27%	2.89%
12	4.84%	2.63%
13	4.45%	2.40%
14	4.09%	2.18%
15	3.76%	1.98%
16	3.45%	1.80%
17	3.16%	1.62%
18	2.89%	1.46%
19	2.64%	1.30%
20	2.39%	1.16%
21	2.16%	0.00%
22	1.94%	0.00%
23	1.74%	0.00%
24	1.54%	0.00%
25	1.35%	0.00%
26 & Over	0.00%	0.00%

*Mortality Assumption:*

Pre-retirement mortality: PUB-2010 General Mortality table, for the Non-Hazardous System, and the PUB-2010 Public Safety Mortality table for the Hazardous System, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2010.

Post-retirement mortality (non-disabled): System-specific mortality table based on mortality experience from 2013-2018, projected with the ultimate rates from the MP-2014 mortality improvement scale using a base year of 2019.

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				
	2020	2025	2030	2035	2040
Male	21.0	21.4	21.8	22.2	22.6
Female	24.0	24.4	24.8	25.2	25.6

Post-retirement mortality (disabled): PUB-2010 Disabled Mortality table, with a 4-year set-forward for both male and female rates, projected with the ultimate rates from the MP-2014 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/Duty-Related Disability*

Non-Hazardous: 2% of disabilities are assumed to be duty-related (100% of which are assumed to be “total and permanent”)

Hazardous: 50% 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 in the Hazardous Plan 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 <sup>1</sup>	Medicare Plans <sup>1</sup>	Dollar Contribution <sup>2</sup>
2023	6.30%	6.30%	1.50%
2024	6.20%	6.20%	1.50%
2025	6.10%	6.10%	1.50%
2026	6.00%	6.00%	1.50%
2027	5.80%	5.80%	1.50%
2028	5.60%	5.60%	1.50%
2029	5.40%	5.40%	1.50%
2030	5.20%	5.20%	1.50%
2031	5.00%	5.00%	1.50%
2032	4.80%	4.80%	1.50%
2033	4.60%	4.60%	1.50%
2034	4.40%	4.40%	1.50%
2035	4.20%	4.20%	1.50%
2036 & Beyond	4.05%	4.05%	1.50%

<sup>1</sup>All increases are assumed to occur on January 1. The 2022 premiums were known at the time of the valuation and were incorporated into the liability measurement

<sup>2</sup>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	50%	100%
10-14	75%	100%
15-19	90%	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	Non-Medicare Plan	Participation Percentage
Medical Only <sup>1</sup>	6%	LivingWell Limited	4%
Essential Plan	8%	LivingWell Basic	2%
Premium Plan	86%	LivingWell CDHP	33%
		LivingWell PPO	61%

<sup>1</sup> Includes Medicare Advantage Mirror Plans

- 50% of deferred vested members participating before July 1, 2003 are assumed to elect health coverage at retirement. 100% of deferred vested members participating after July 1, 2003 are assumed to elect health coverage at retirement.
- Deferred vested members receiving insurance benefits from the non-hazardous fund are assumed to begin health coverage at age 55 for members participating before September 1, 2008, at age 60 for members participating on or after September 1, 2008 but before January 1, 2014, and at age 65 for members participating on or after January 1, 2014.
- Deferred vested members receiving insurance benefits from the hazardous fund 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.
- 75% of future retirees, with hazardous service, are assumed to elect spouse health care coverage. No dependent coverage is assumed for members who only have non-hazardous service. 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 terminate 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 5.6875% (based upon the 6.25% assumed investment return). The interest crediting rate after a member terminates employment is 4%.
8. 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.
9. Service: All members are assumed to accrue 1 year of benefit and eligibility service each year.
10. 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.
11. 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.





12. 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. Non-hazardous members are assumed to retire at age 65. Hazardous members hired prior to September 1, 2008 are assumed to retire at age 55 and hazardous members hired on or after September 1, 2008 are assumed to retire at age 60.

#### *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:*

None

## Development of Baseline Claims Cost

For non-Medicare retirees, the initial per capita costs were based on the plan premiums effective January 1, 2022, 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 \$926.73 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.

<b>FOR THOSE NOT ELIGIBLE FOR MEDICARE</b>		
<b>AGE</b>	<b>MEMBER</b>	<b>SPOUSE/DEPENDENTS</b>
<65	\$758.99	\$926.73

For Medicare retirees, the initial per capita costs were estimated based on the plan premiums effective January 1, 2022, 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.

<b>FOR THOSE ELIGIBLE FOR MEDICARE</b>		
<b>AGE</b>	<b>MALE</b>	<b>FEMALE</b>
65	\$188.91	\$178.18
75	221.03	215.67
85	233.72	236.47



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

Mehdi Riazi 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.



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Mehdi Riazi, FSA, EA, FCA, MAAA

## **APPENDIX B**

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### **BENEFIT PROVISIONS**

# Summary of Benefit Provisions for County Employees Retirement System (CERS)

## CERS Non-Hazardous Employees

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

Normal Retirement Eligibility	Age 65 with at least 1 month of service credit; or Any age with at least 27 years of service
Benefit Amount	<p>If a member has at least 48 months of service, the monthly benefit is 2.00% times final average compensation times years of service. For members who began participating prior to 8/1/2004, the monthly benefit is 2.20% times final average compensation times years of service.</p> <p>If a member has less than 48 months of service, the monthly benefit is the actuarial equivalent of two times the member's contributions with interest.</p> <p>Final average compensation is based on the member's highest 5 years of compensation.</p>
Early Retirement Eligibility	Any age (prior to age 65) with at least 25 years of service; or Age 55 with at least 5 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.



## CERS Non-Hazardous Employees (continued)

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

Normal Retirement Eligibility	Age 65 with at least 5 years of service; or Rule of 87 (Age 57 or older if age plus service equals 87)
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	1.10%
10-20	1.30%
20-26	1.50%
26-30	1.75%
Greater than 30*	2.00%

\* The 2.00% benefit multiplier only applies to service credit in excess of 30 years. If a member has greater than 30 years of service at retirement, service prior to 30 years will be multiplied by the 1.75% benefit multiplier.

Final compensation is based on the member's last 5 years of compensation.

Early Retirement Eligibility	Age 60 with at least 10 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 65 with at least 5 years of service; or Rule of 87 (Age 57 or older if age plus service equals 87)
Benefit Amount	Each year that the member is active, a 4.00% employer pay credit and the employee's 5.00% 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.  At retirement, the member's hypothetical account balance may be converted into an annuity based on an actuarial factor.
Early Retirement Eligibility	N/A



## CERS Non-Hazardous 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 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 65th birthday, with total service not exceeding 25 years. Total service credit added shall not be greater than the member's actual service at disability. For members with at least 25 years of service on the last day of paid employment but less than 27 years of service, total service shall be 27 years. For members with 27 or more years of service credit, actual service will be used.



## CERS Non-Hazardous 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 20% 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 20% of the member's final monthly rate of pay or the member's retirement benefit calculated at the member's normal retirement date.

### *Duty-Related 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 (and the member is working in a non-hazardous position that could be certified as a hazardous position), 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 65 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.





## CERS Non-Hazardous 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.
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 monthly average pay for two children, or 75% of final monthly 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	5% 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	5% 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	5% 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 since the Prior Valuation*

Senate Bill 169 passed during the 2021 legislative session and increased the disability benefits for qualified members who become "totally and permanently disabled" as a result of a duty-related disability. The minimum disability benefit increased from 25% of the member's monthly final rate of pay to 75% of the member's monthly average pay. 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.



## CERS Hazardous 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 date precedes the member's normal retirement eligibility.

## CERS Hazardous 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 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 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.  At retirement, the member's hypothetical account balance may be converted into an annuity based on an actuarial factor.
Early Retirement Eligibility	N/A



## CERS Hazardous 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 55 <sup>th</sup> birthday, with total service not exceeding 20 years. Total service credit added shall not be greater than the member's actual service at disability.



## CERS Hazardous 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.



## CERS Hazardous 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 since the Prior Valuation*

Senate Bill 169 passed during the 2021 legislative session and increased the disability benefits for qualified members who become "totally and permanently disabled" in the line of duty. The minimum disability benefit increased from 25% of the member's monthly final rate of pay to 75% of the member's monthly average pay.



## Summary of Main Retiree Insurance Benefit Provisions

### Insurance Tier 1: 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. This benefit is provided to members in the Non-hazardous and Hazardous plans alike.

**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. This benefit is provided to members in the Non-hazardous and Hazardous plans alike.

**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 Tier 2: Participation began on or after 7/1/2003, but before 9/1/2008

<b>Benefit Eligibility</b>	Recipient of a retirement allowance with at least 120 months of service at retirement
<b>Non-Hazardous Subsidy</b>	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, 2021, the Non-Hazardous monthly contribution was \$13.99/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.
<b>Hazardous Subsidy</b>	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, 2021, the Hazardous monthly contribution was \$20.99/year of service. Upon the retiree's death, the surviving spouse of a hazardous duty member will receive a monthly contribution of \$10 (\$13.99 as of July 1, 2021) for each year of hazardous service.
<b>Duty Disability Retirement</b>	<p>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.</p> <p>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.</p>
<b>Duty Death in Service</b>	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. This benefit is provided to members in the Non-Hazardous and Hazardous plans alike.
<b>Non-Duty Death in Service</b>	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.

## Insurance Tier 3: Participation began on or after 9/1/2008

Tier 3 insurance benefits are identical to Tier 2, except Tier 3 members are required to have at least 180 months of service in order to be eligible.





## Monthly Health Plan Premiums – Effective January 1, 2022

Plan Option	Non-Medicare Plan Options				
	Single	Parent Plus	Couple	Family	Family X-Ref
LivingWell PPO <sup>1</sup>	\$772.16	\$1,101.08	\$1,691.64	\$1,883.60	\$929.70
LivingWell CDHP	750.30	1,036.40	1,453.30	1,623.94	866.72
LivingWell Basic	721.54	994.72	1,537.72	1,713.58	846.38
Living Well Limited	642.02	914.78	1,407.32	1,566.78	772.32

Medicare Plan Options	
Medical Only Plan	\$186.87
Medicare Advantage Mirror Essential Plan	228.12
Medicare Advantage Mirror Premium Plan	327.97
Kentucky Retirement Systems – Essential Plan <sup>2</sup>	49.25
Kentucky Retirement Systems – Premium Plan <sup>3</sup>	227.03

<sup>1</sup> Contribution plan selected by the Board was the LivingWell PPO plan option for non-Medicare retirees.

<sup>2</sup> Contribution rate for retirees selected by the Board remains at \$75.56.

<sup>3</sup> Contribution rate for retirees selected by the Board remains at \$252.51.

## Dollar Contribution Amount for Insurance Tier 2 and Tier 3

Monthly contribution amounts per year of service as of July 1, 2021.

Non-Hazardous Service	Hazardous Service
\$13.99	\$20.99

### Changes since the Prior Valuation

Senate Bill 169 passed during the 2021 legislative session and increased the disability benefits for qualified members who become “totally and permanently disabled” in the line of duty or as a result of a duty-related disability. The insurance premium for the member, the member’s spouse, and the member’s dependent children shall 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.

## **APPENDIX C**

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### **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 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.



December 1, 2021

Board of Trustees  
County Employees Retirement System  
Perimeter Park West  
1260 Louisville Road  
Frankfort, KY 40601

**Re: Sensitivity Analysis Based on Results of the June 30, 2021 Actuarial Valuation**

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 enclosed tables show the impact for the **County Employees Retirement System (CERS)** 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 6.25% for the CERS non-hazardous and hazardous retirement and insurance funds. 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 2.30% 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 CERS make contributions to the system as a percentage of the 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 2.00% for all the CERS 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, 2021 actuarial valuation report. Please refer to the June 30, 2021 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.

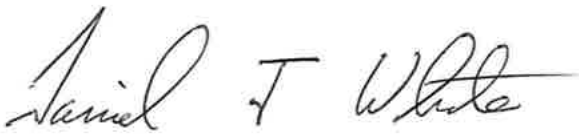




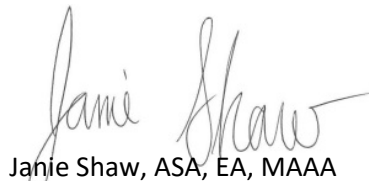
The undersigned are independent actuaries and consultants. Both of the undersigned are Enrolled Actuaries, Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. Both of the undersigned are experienced 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



Jamie Shaw, ASA, EA, MAAA  
Consultant

**Sensitivity Analysis - Discount Rate**  
**Non-Hazardous Members**  
(Dollar amounts expressed in thousands)

(1)	Decrease Discount Rate (2)	Valuation Results (3)	Increase Discount Rate (4)
Payroll Growth Rate	2.00%	2.00%	2.00%
Inflation Rate	2.30%	2.30%	2.30%
Discount Rate - Retirement	5.25%	6.25%	7.25%
Discount Rate - Insurance	5.25%	6.25%	7.25%
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 16,691,423	\$ 14,894,906	\$ 13,407,431
Actuarial Value of Assets	7,715,883	7,715,883	7,715,883
Unfunded Actuarial Accrued Liability	8,975,540	7,179,023	5,691,548
Funded Ratio	46.2%	51.8%	57.5%
Actuarially Determined Contribution Rate	29.33%	23.40%	18.39%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 3,933,488	\$ 3,450,484	\$ 3,055,228
Actuarial Value of Assets	2,947,312	2,947,312	2,947,312
Unfunded Actuarial Accrued Liability	986,176	503,172	107,916
Funded Ratio	74.9%	85.4%	96.5%
Actuarially Determined Contribution Rate	5.62%	3.39%	1.44%
<b>Combined</b>			
Actuarial Accrued Liability	\$ 20,624,911	\$ 18,345,390	\$ 16,462,659
Actuarial Value of Assets	10,663,195	10,663,195	10,663,195
Unfunded Actuarial Accrued Liability	9,961,716	7,682,195	5,799,464
Funded Ratio	51.7%	58.1%	64.8%
Actuarially Determined Contribution Rate	34.95%	26.79%	19.83%



**Sensitivity Analysis - Inflation Rate**  
**Non-Hazardous Members**  
(Dollar amounts expressed in thousands)

(1)	Decrease Inflation Rate (2)	Valuation Results (3)	Increase Inflation Rate (4)
Payroll Growth Rate	1.75%	2.00%	2.25%
Inflation Rate	2.05%	2.30%	2.55%
Discount Rate - Retirement	6.00%	6.25%	6.50%
Discount Rate - Insurance	6.00%	6.25%	6.50%
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 15,271,045	\$ 14,894,906	\$ 14,536,063
Actuarial Value of Assets	7,715,883	7,715,883	7,715,883
Unfunded Actuarial Accrued Liability	7,555,162	7,179,023	6,820,180
Funded Ratio	50.5%	51.8%	53.1%
Actuarially Determined Contribution Rate	24.94%	23.40%	21.93%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 3,488,189	\$ 3,450,484	\$ 3,414,990
Actuarial Value of Assets	2,947,312	2,947,312	2,947,312
Unfunded Actuarial Accrued Liability	540,877	503,172	467,678
Funded Ratio	84.5%	85.4%	86.3%
Actuarially Determined Contribution Rate	3.63%	3.39%	3.17%
<b>Combined</b>			
Actuarial Accrued Liability	\$ 18,759,234	\$ 18,345,390	\$ 17,951,053
Actuarial Value of Assets	10,663,195	10,663,195	10,663,195
Unfunded Actuarial Accrued Liability	8,096,039	7,682,195	7,287,858
Funded Ratio	56.8%	58.1%	59.4%
Actuarially Determined Contribution Rate	28.57%	26.79%	25.10%

**Sensitivity Analysis - Payroll Growth**  
**Non-Hazardous Members**  
(Dollar amounts expressed in thousands)

(1)	Decrease Payroll Growth (2)	Valuation Results (3)	Increase Payroll Growth (4)
Payroll Growth Rate	1.00%	2.00%	3.00%
Inflation Rate	2.30%	2.30%	2.30%
Discount Rate - Retirement	6.25%	6.25%	6.25%
Discount Rate - Insurance	6.25%	6.25%	6.25%
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 14,894,906	\$ 14,894,906	\$ 14,894,906
Actuarial Value of Assets	7,715,883	7,715,883	7,715,883
Unfunded Actuarial Accrued Liability	7,179,023	7,179,023	7,179,023
Funded Ratio	51.8%	51.8%	51.8%
Actuarially Determined Contribution Rate	25.43%	23.40%	21.51%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 3,450,484	\$ 3,450,484	\$ 3,450,484
Actuarial Value of Assets	2,947,312	2,947,312	2,947,312
Unfunded Actuarial Accrued Liability	503,172	503,172	503,172
Funded Ratio	85.4%	85.4%	85.4%
Actuarially Determined Contribution Rate	3.54%	3.39%	3.25%
<b>Combined</b>			
Actuarial Accrued Liability	\$ 18,345,390	\$ 18,345,390	\$ 18,345,390
Actuarial Value of Assets	10,663,195	10,663,195	10,663,195
Unfunded Actuarial Accrued Liability	7,682,195	7,682,195	7,682,195
Funded Ratio	58.1%	58.1%	58.1%
Actuarially Determined Contribution Rate	28.97%	26.79%	24.76%



**Sensitivity Analysis - Discount Rate**  
**Hazardous Members**  
(Dollar amounts expressed in thousands)

(1)	Decrease Discount Rate (2)	Valuation Results (3)	Increase Discount Rate (4)
Payroll Growth Rate	2.00%	2.00%	2.00%
Inflation Rate	2.30%	2.30%	2.30%
Discount Rate - Retirement	5.25%	6.25%	7.25%
Discount Rate - Insurance	5.25%	6.25%	7.25%
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 6,370,300	\$ 5,629,458	\$ 5,026,026
Actuarial Value of Assets	2,628,621	2,628,621	2,628,621
Unfunded Actuarial Accrued Liability	3,741,679	3,000,837	2,397,405
Funded Ratio	41.3%	46.7%	52.3%
Actuarially Determined Contribution Rate	53.49%	42.81%	33.93%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 1,986,555	\$ 1,751,203	\$ 1,560,638
Actuarial Value of Assets	1,475,635	1,475,635	1,475,635
Unfunded Actuarial Accrued Liability	510,920	275,568	85,003
Funded Ratio	74.3%	84.3%	94.6%
Actuarially Determined Contribution Rate	10.98%	6.78%	3.09%
<b>Combined</b>			
Actuarial Accrued Liability	\$ 8,356,855	\$ 7,380,661	\$ 6,586,664
Actuarial Value of Assets	4,104,256	4,104,256	4,104,256
Unfunded Actuarial Accrued Liability	4,252,599	3,276,405	2,482,408
Funded Ratio	49.1%	55.6%	62.3%
Actuarially Determined Contribution Rate	64.47%	49.59%	37.02%

**Sensitivity Analysis - Inflation Rate**  
**Hazardous Members**  
(Dollar amounts expressed in thousands)

(1)	Decrease Inflation Rate (2)	Valuation Results (3)	Increase Inflation Rate (4)
Payroll Growth Rate	1.75%	2.00%	2.25%
Inflation Rate	2.05%	2.30%	2.55%
Discount Rate - Retirement	6.00%	6.25%	6.50%
Discount Rate - Insurance	6.00%	6.25%	6.50%
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 5,785,313	\$ 5,629,458	\$ 5,481,043
Actuarial Value of Assets	2,628,621	2,628,621	2,628,621
Unfunded Actuarial Accrued Liability	3,156,692	3,000,837	2,852,422
Funded Ratio	45.4%	46.7%	48.0%
Actuarially Determined Contribution Rate	45.59%	42.81%	40.18%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 1,764,970	\$ 1,751,203	\$ 1,738,251
Actuarial Value of Assets	1,475,635	1,475,635	1,475,635
Unfunded Actuarial Accrued Liability	289,335	275,568	262,616
Funded Ratio	83.6%	84.3%	84.9%
Actuarially Determined Contribution Rate	7.15%	6.78%	6.41%
<b>Combined</b>			
Actuarial Accrued Liability	\$ 7,550,283	\$ 7,380,661	\$ 7,219,294
Actuarial Value of Assets	4,104,256	4,104,256	4,104,256
Unfunded Actuarial Accrued Liability	3,446,027	3,276,405	3,115,038
Funded Ratio	54.4%	55.6%	56.9%
Actuarially Determined Contribution Rate	52.74%	49.59%	46.59%

## Sensitivity Analysis - Payroll Growth

### Hazardous Members

(Dollar amounts expressed in thousands)

(1)	Decrease Payroll Growth (2)	Valuation Results (3)	Increase Payroll Growth (4)
Payroll Growth Rate	1.00%	2.00%	3.00%
Inflation Rate	2.30%	2.30%	2.30%
Discount Rate - Retirement	6.25%	6.25%	6.25%
Discount Rate - Insurance	6.25%	6.25%	6.25%
<b>Retirement</b>			
Actuarial Accrued Liability	\$ 5,629,458	\$ 5,629,458	\$ 5,629,458
Actuarial Value of Assets	2,628,621	2,628,621	2,628,621
Unfunded Actuarial Accrued Liability	3,000,837	3,000,837	3,000,837
Funded Ratio	46.7%	46.7%	46.7%
Actuarially Determined Contribution Rate	46.55%	42.81%	39.34%
<b>Insurance</b>			
Actuarial Accrued Liability	\$ 1,751,203	\$ 1,751,203	\$ 1,751,203
Actuarial Value of Assets	1,475,635	1,475,635	1,475,635
Unfunded Actuarial Accrued Liability	275,568	275,568	275,568
Funded Ratio	84.3%	84.3%	84.3%
Actuarially Determined Contribution Rate	7.12%	6.78%	6.46%
<b>Combined</b>			
Actuarial Accrued Liability	\$ 7,380,661	\$ 7,380,661	\$ 7,380,661
Actuarial Value of Assets	4,104,256	4,104,256	4,104,256
Unfunded Actuarial Accrued Liability	3,276,405	3,276,405	3,276,405
Funded Ratio	55.6%	55.6%	55.6%
Actuarially Determined Contribution Rate	53.67%	49.59%	45.80%



**County Employees Retirement System  
CERS Non-Hazardous Retirement Fund  
(\$ in Millions)**

Fiscal Year Beginning July 1, (1)	Actuarial Accrued Liability (2)	Actuarial Value of Assets (3)	Unfunded Actuarial Accrued Liability (4)	Funded Ratio (3) / (2) (5)	Employer Contribution (6)	Member Contribution (7)	Covered Payroll (8)	Employer Contribution as % of Covered Payroll (9)	Employer Actuarially Determined Contribution (10)
2021	\$ 14,895	\$ 7,716	\$ 7,179	52%	\$ 576	\$ 126	\$ 2,529	22.78%	23.88%
2022	15,240	8,308	6,932	55%	604	129	2,579	23.40%	23.40%
2023	15,563	8,881	6,682	57%	585	132	2,631	22.25%	22.25%
2024	15,867	9,432	6,435	59%	572	134	2,684	21.33%	21.33%
2025	16,152	10,034	6,118	62%	560	137	2,737	20.45%	20.45%
2026	16,415	10,340	6,075	63%	542	140	2,792	19.42%	19.42%
2027	16,656	10,612	6,044	64%	547	142	2,848	19.21%	19.21%
2028	16,875	10,871	6,004	64%	553	145	2,905	19.03%	19.03%
2029	17,073	11,119	5,954	65%	559	148	2,963	18.86%	18.86%
2030	17,253	11,359	5,894	66%	565	151	3,022	18.70%	18.70%
2031	17,416	11,595	5,821	67%	572	154	3,083	18.56%	18.56%
2032	17,575	11,838	5,737	67%	579	157	3,144	18.43%	18.43%
2033	17,722	12,084	5,638	68%	588	160	3,207	18.32%	18.32%
2034	17,859	12,333	5,526	69%	596	164	3,271	18.22%	18.22%
2035	17,988	12,591	5,397	70%	605	167	3,337	18.13%	18.13%
2036	18,112	12,861	5,251	71%	614	170	3,403	18.05%	18.05%
2037	18,236	13,148	5,088	72%	625	174	3,471	17.99%	17.99%
2038	18,365	13,461	4,904	73%	635	177	3,541	17.93%	17.93%
2039	18,502	13,802	4,700	75%	646	181	3,612	17.89%	17.89%
2040	18,651	14,179	4,472	76%	650	184	3,684	17.64%	17.64%
2041	18,815	14,586	4,229	78%	697	188	3,758	18.54%	18.54%
2042	18,995	15,071	3,924	79%	742	192	3,833	19.35%	19.35%
2043	19,193	15,638	3,555	82%	783	195	3,909	20.02%	20.02%
2044	19,411	16,287	3,124	84%	824	199	3,988	20.66%	20.66%
2045	19,649	17,025	2,624	87%	873	203	4,067	21.47%	21.47%
2046	19,910	17,864	2,046	90%	891	207	4,149	21.47%	21.47%
2047	20,194	18,778	1,416	93%	909	212	4,232	21.47%	21.47%
2048	20,501	19,771	730	96%	926	216	4,316	21.46%	21.46%
2049	20,834	20,834	-	100%	160	220	4,403	3.64%	3.64%
2050	21,193	21,193	-	100%	163	225	4,491	3.64%	3.64%

Notes and assumptions:

The projection is based on the results of the June 30, 2021 actuarial valuation and assumes that all actuarial assumptions are realized, including the assumed annual asset return of 6.25%.

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 remain level throughout the entire projection.

Covered payroll is assumed to increase 2% each year throughout the entire projection.

The Board certified contribution rate paid by employers is assumed to be equal to the full actuarially determined contribution rate, except as allowed by

House Bill 362 (passed during the 2018 legislative session), which limits the certified contribution rate to a 12% increase over the prior year rate for the period of July 1, 2018 to June 30, 2028.





**County Employees Retirement System**  
**CERS Hazardous Retirement Fund**  
(\$ in Millions)

Fiscal Year Beginning July 1, (1)	Actuarial Accrued Liability (2)	Actuarial Value of Assets (3)	Unfunded Actuarial Accrued Liability (4)	Funded Ratio (3) / (2) (5)	Employer Contribution (6)	Member Contribution (7)	Covered Payroll (8)	Employer Contribution as % of Covered Payroll (9)	Employer Actuarially Determined Contribution (10)
2021	\$ 5,629	\$ 2,629	\$ 3,000	47%	\$ 206	\$ 46	\$ 578	35.60%	43.23%
2022	5,784	2,834	2,950	49%	253	47	590	42.81%	42.81%
2023	5,929	3,067	2,862	52%	247	48	602	41.04%	41.04%
2024	6,067	3,292	2,775	54%	243	49	614	39.63%	39.63%
2025	6,199	3,537	2,662	57%	240	50	626	38.29%	38.29%
2026	6,324	3,685	2,639	58%	234	51	639	36.70%	36.70%
2027	6,444	3,825	2,619	59%	237	52	651	36.33%	36.33%
2028	6,560	3,963	2,597	60%	239	53	664	36.00%	36.00%
2029	6,671	4,103	2,568	62%	242	54	678	35.68%	35.68%
2030	6,782	4,247	2,535	63%	245	55	691	35.43%	35.43%
2031	6,893	4,398	2,495	64%	248	56	705	35.22%	35.22%
2032	7,008	4,558	2,450	65%	252	58	719	35.04%	35.04%
2033	7,125	4,727	2,398	66%	256	59	733	34.88%	34.88%
2034	7,247	4,908	2,339	68%	260	60	748	34.74%	34.74%
2035	7,371	5,099	2,272	69%	264	61	763	34.60%	34.60%
2036	7,499	5,302	2,197	71%	268	62	778	34.46%	34.46%
2037	7,628	5,515	2,113	72%	272	64	794	34.31%	34.31%
2038	7,757	5,737	2,020	74%	277	65	810	34.15%	34.15%
2039	7,883	5,968	1,915	76%	281	66	826	33.98%	33.98%
2040	8,009	6,209	1,800	78%	272	67	843	32.34%	32.34%
2041	8,134	6,448	1,686	79%	279	69	859	32.43%	32.43%
2042	8,261	6,701	1,560	81%	294	70	877	33.59%	33.59%
2043	8,390	6,981	1,409	83%	309	72	894	34.53%	34.53%
2044	8,522	7,288	1,234	86%	323	73	912	35.45%	35.45%
2045	8,657	7,621	1,036	88%	341	74	930	36.67%	36.67%
2046	8,792	7,986	806	91%	348	76	949	36.67%	36.67%
2047	8,931	8,373	558	94%	355	77	968	36.68%	36.68%
2048	9,072	8,785	287	97%	362	79	987	36.70%	36.70%
2049	9,215	9,215	-	100%	59	81	1,007	5.88%	5.88%
2050	9,361	9,361	-	100%	61	82	1,027	5.90%	5.90%

Notes and assumptions:

The projection is based on the results of the June 30, 2021 actuarial valuation and assumes that all actuarial assumptions are realized, including the assumed annual asset return of 6.25%.

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 remain level throughout the entire projection.

Covered payroll is assumed to increase 2% each year throughout the entire projection.

The Board certified contribution rate paid by employers is assumed to be equal to the full actuarially determined contribution rate, except as allowed by

House Bill 362 (passed during the 2018 legislative session), which limits the certified contribution rate to a 12% increase over the prior year rate for the period of July 1, 2018 to June 30, 2028.



**County Employees Retirement System  
CERS Non-Hazardous Insurance Fund  
(\$ in Millions)**

Fiscal Year Beginning July 1, (1)	Actuarial Accrued Liability (2)	Actuarial Value of Assets (3)	Unfunded Actuarial Accrued Liability (4)	Funded Ratio (3) / (2) (5)	Employer Contribution (6)	Member Contribution (7)	Covered Payroll (8)	Employer Contribution as % of Covered Payroll (9)	Employer Actuarially Determined Contribution (10)
2021	\$ 3,450	\$ 2,947	\$ 503	85%	\$ 104	\$ 14	\$ 2,499	4.17%	4.17%
2022	3,595	3,196	399	89%	86	15	2,549	3.39%	3.39%
2023	3,736	3,415	321	91%	76	16	2,600	2.93%	2.93%
2024	3,872	3,624	248	94%	68	18	2,652	2.55%	2.55%
2025	4,000	3,849	151	96%	59	19	2,706	2.19%	2.19%
2026	4,122	3,966	156	96%	48	20	2,760	1.75%	1.75%
2027	4,234	4,064	170	96%	46	22	2,815	1.62%	1.62%
2028	4,337	4,152	185	96%	42	23	2,871	1.48%	1.48%
2029	4,431	4,230	201	96%	40	24	2,929	1.35%	1.35%
2030	4,517	4,297	220	95%	37	26	2,987	1.24%	1.24%
2031	4,596	4,355	241	95%	35	27	3,047	1.14%	1.14%
2032	4,668	4,405	263	94%	32	28	3,108	1.04%	1.04%
2033	4,735	4,448	287	94%	31	29	3,170	0.97%	0.97%
2034	4,800	4,487	313	94%	29	30	3,233	0.90%	0.90%
2035	4,865	4,522	343	93%	28	31	3,298	0.85%	0.85%
2036	4,931	4,557	374	92%	27	32	3,364	0.79%	0.79%
2037	5,000	4,592	408	92%	26	33	3,431	0.76%	0.76%
2038	5,072	4,627	445	91%	26	34	3,500	0.74%	0.74%
2039	5,146	4,662	484	91%	25	35	3,570	0.71%	0.71%
2040	5,224	4,698	526	90%	63	36	3,641	1.74%	1.74%
2041	5,305	4,774	531	90%	90	37	3,714	2.42%	2.42%
2042	5,390	4,880	510	91%	102	38	3,788	2.70%	2.70%
2043	5,479	5,004	475	91%	114	38	3,864	2.94%	2.94%
2044	5,571	5,145	426	92%	124	39	3,941	3.15%	3.15%
2045	5,666	5,303	363	94%	138	40	4,020	3.44%	3.44%
2046	5,764	5,483	281	95%	141	41	4,101	3.44%	3.44%
2047	5,864	5,672	192	97%	144	42	4,183	3.44%	3.44%
2048	5,966	5,870	96	98%	146	43	4,266	3.42%	3.42%
2049	6,068	6,068	-	100%	37	43	4,352	0.84%	0.84%
2050	6,171	6,171	-	100%	37	44	4,439	0.83%	0.83%

Notes and assumptions:

The projection is based on the results of the June 30, 2021 actuarial valuation and assumes that all actuarial assumptions are realized, including the assumed annual asset return of 6.25%.

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 remain level throughout the entire projection.

Covered payroll is assumed to increase 2% each year throughout the entire projection.

The Board certified contribution rate paid by employers is assumed to be equal to the full actuarially determined contribution rate, except as allowed by

House Bill 362 (passed during the 2018 legislative session), which limits the certified contribution rate to a 12% increase over the prior year rate for the period of July 1, 2018 to June 30, 2028.



**County Employees Retirement System  
CERS Hazardous 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)
2021	\$ 1,751	\$ 1,476	\$ 275	84%	\$ 50	\$ 3	\$ 573	8.73%	8.73%
2022	1,797	1,578	219	88%	40	3	585	6.78%	6.78%
2023	1,836	1,660	176	90%	34	4	597	5.62%	5.62%
2024	1,868	1,731	137	93%	29	4	609	4.71%	4.71%
2025	1,892	1,808	84	96%	24	5	621	3.88%	3.88%
2026	1,912	1,829	83	96%	19	5	633	2.93%	2.93%
2027	1,928	1,840	88	95%	17	5	646	2.68%	2.68%
2028	1,939	1,846	93	95%	16	6	659	2.48%	2.48%
2029	1,945	1,848	97	95%	16	6	672	2.31%	2.31%
2030	1,950	1,846	104	95%	15	6	685	2.18%	2.18%
2031	1,952	1,842	110	94%	15	6	699	2.08%	2.08%
2032	1,952	1,835	117	94%	14	7	713	2.00%	2.00%
2033	1,953	1,828	125	94%	14	7	727	1.94%	1.94%
2034	1,954	1,821	133	93%	14	7	742	1.88%	1.88%
2035	1,956	1,815	141	93%	14	7	757	1.85%	1.85%
2036	1,961	1,810	151	92%	14	8	772	1.82%	1.82%
2037	1,970	1,809	161	92%	14	8	787	1.79%	1.79%
2038	1,983	1,811	172	91%	14	8	803	1.78%	1.78%
2039	1,998	1,814	184	91%	14	8	819	1.75%	1.75%
2040	2,018	1,822	196	90%	20	8	835	2.36%	2.36%
2041	2,041	1,837	204	90%	32	9	852	3.77%	3.77%
2042	2,067	1,867	200	90%	39	9	869	4.45%	4.45%
2043	2,097	1,909	188	91%	44	9	887	4.97%	4.97%
2044	2,130	1,959	171	92%	49	9	904	5.47%	5.47%
2045	2,166	2,018	148	93%	57	9	922	6.14%	6.14%
2046	2,202	2,088	114	95%	58	9	941	6.13%	6.13%
2047	2,240	2,161	79	97%	59	10	960	6.11%	6.11%
2048	2,278	2,238	40	98%	60	10	979	6.11%	6.11%
2049	2,316	2,316	-	100%	16	10	998	1.62%	1.62%
2050	2,354	2,354	-	100%	16	10	1,018	1.61%	1.61%

Notes and assumptions:

The projection is based on the results of the June 30, 2021 actuarial valuation and assumes that all actuarial assumptions are realized, including the assumed annual asset return of 6.25%.

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 remain level throughout the entire projection.

Covered payroll is assumed to increase 2% each year throughout the entire projection.

The Board certified contribution rate paid by employers is assumed to be equal to the full actuarially determined contribution rate, except as allowed by

House Bill 362 (passed during the 2018 legislative session), which limits the certified contribution rate to a 12% increase over the prior year rate for the period of July 1, 2018 to June 30, 2028.

