



# Cavanaugh Macdonald

CONSULTING, LLC

*The experience and dedication you deserve*

May 11, 2022

Dr. L. C. Evans  
Executive Director  
Teachers Retirement System of Georgia  
Suite 100, Two Northside 75  
Atlanta, GA 30318

Dear Dr. Evans:

Enclosed are 20 bound copies of the "Teachers Retirement System of Georgia Report of the Actuary on the Valuation Prepared as of June 30, 2021".

The valuation indicates that employer contributions at the rate of 19.98% of compensation for the fiscal year ending June 30, 2024 are sufficient to support the benefits of the System. The valuation takes into account the effect of all amendments to the System enacted through the 2021 Session of the General Assembly.

Please let us know if there are any questions concerning the report.

Sincerely yours,

John J. Garrett, ASA, FCA, MAAA  
Principal and Consulting Actuary

Cathy Turcot  
Principal and Managing Director

Edward J. Koebel, EA, FCA, MAAA  
Chief Executive Officer

Enclosure



**Cavanaugh Macdonald**  
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**TEACHERS RETIREMENT SYSTEM OF GEORGIA**

**REPORT OF THE ACTUARY ON THE VALUATION  
PREPARED AS OF JUNE 30, 2021**





# Cavanaugh Macdonald

CONSULTING, LLC

*The experience and dedication you deserve*

May 11, 2022

Board of Trustees  
Teachers Retirement System of Georgia  
Suite 100, Two Northside 75  
Atlanta, GA 30318

Members of the Board:

Section 47-3-23 of the law governing the operation of the Teachers Retirement System of Georgia provides that the actuary shall make annual valuations of the contingent assets and liabilities of the Retirement System on the basis of regular interest and the tables last adopted by the Board of Trustees. We have submitted the report giving the results of the actuarial valuation of the System prepared as of June 30, 2021. The report indicates that annual employer contributions at the rate of 19.98% of compensation for the fiscal year ending June 30, 2024 are sufficient to support the benefits of the System. Our firm, as actuary, is responsible for all of the actuarial trend data in the financial section of the annual report and the supporting schedules in the actuarial section of the annual report.

The Actuarial Standards Board has revised the Actuarial Standard of Practice Number 4 (ASOP 4), *Measuring Pension Obligations and Determining Pension Plan Costs or Contributions*, which will be effective for the System beginning with the June 30, 2023 actuarial valuation. There are a number of changes incorporated in ASOP 4 which will bear on the actuarial methods utilized in the System's funding policy. In this valuation, we recommend changes to the current funding policy along with changes to the economic assumptions both to reduce potential future contribution volatility, as well as to prepare for the upcoming funding policy changes related to ASOP 4. Therefore, in this valuation, we recommend the assumed annual rate of return on investments decrease from 7.25% to 6.90%, and the payroll growth assumption decrease from 3.00% to 2.50%. In addition, we recommend the Board funding policy define a new transitional unfunded actuarial accrued liability (UAAL) amortization base as of this valuation and reduce the amortization period for the transitional base to a period not to exceed 23 years and reduce the amortization period for future incremental UAAL bases from 30 years to 25 years.

In addition, the asset smoothing method has been modified for the June 30, 2021 valuation, in order to mitigate the impact of the assumption and methodology changes mentioned above, and to take advantage of the annual return on fair value of assets of 29.2% during the fiscal year ending June 30, 2021. The amount of the substantial asset gain recognized this year was an amount such that the total UAAL was the same as if no assumptions or methods had been changed. The remaining unrecognized asset gain will be spread equally over the four-year period following this valuation.



May 11, 2022  
Board of Trustees  
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In our opinion, the valuation is complete and accurate, and the incorporated methodology and assumptions are reasonable as a basis for the valuation. The valuation takes into account the effect of all amendments to the System enacted through the 2021 Session of the General Assembly. In preparing the valuation, the actuary relied on data provided by the System. While not verifying data at the source, the actuary performed tests for consistency and reasonableness.

The System is funded on an actuarial reserve basis. The actuarial assumptions recommended by the actuary and adopted by the Board are both individually and, in the aggregate, reasonably related to the experience under the System and to reasonable expectations of anticipated experience under the System. The assumptions and methods used for financial reporting purposes meet the parameters set by Actuarial Standards of Practice (ASOPS). The funding objective of the plan is that contribution rates over time will remain level as a percent of payroll. The valuation method used is the entry age normal cost method. The normal contribution rate to cover current cost has been determined as a level percent of payroll. Gains and losses are reflected in the unfunded accrued liability, which is amortized as a level percent of payroll in accordance with the funding policy adopted by the Board.

The Plan and the employers are required to comply with the financial reporting requirements of GASB Statements No. 67 and 68. The necessary disclosure information is provided in separate supplemental reports.

We have provided the following information and supporting schedules for the Actuarial Section of the Annual Comprehensive Annual Report:

- Summary of Actuarial Assumptions and Methods
- Schedule of Active Members
- Schedule of Retirees and Beneficiaries Added to and Removed from Rolls
- Schedule of Funding Progress
- Analysis of Financial Experience

The System is being funded in conformity with the minimum funding standard set forth in Code Section 47-20-10 of the Public Retirement Systems Standards Law. In our opinion, the System is operating on an actuarially sound basis. Assuming that contributions to the System are made by the employer from year to year in the future at the rates recommended on the basis of the successive actuarial valuations, the continued sufficiency of the retirement fund to provide the benefits called for under the System may be reasonably anticipated.



May 11, 2022  
Board of Trustees  
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Future actuarial results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the 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. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

In order to prepare the results in this report we have utilized appropriate actuarial models that were developed for this purpose. These models use assumptions about future contingent events along with recognized actuarial approaches to develop the needed results.

The actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the System. Use of these computations for purposes other than meeting these requirements may not be appropriate.

This is to certify that John Garrett and Ed Koebel are members of the American Academy of Actuaries and have experience in performing valuations for public retirement systems, that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

Sincerely yours,

A handwritten signature in blue ink that reads 'John J. Garrett'.

John J. Garrett, ASA, FCA, MAAA  
Principal and Consulting Actuary

A handwritten signature in blue ink that reads 'Cathy Turcot'.

Cathy Turcot  
Principal and Managing Director

A handwritten signature in blue ink that reads 'Edward J. Koebel'.

Edward J. Koebel, EA, FCA, MAAA  
Chief Executive Officer



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## Section I – Summary of Principal Results

1. For convenience of reference, the principal results of the valuation and a comparison with the preceding year's results are summarized below (all dollar amounts are in thousands):

Valuation Date	June 30, 2021	June 30, 2020
<b>Discount Rate</b>	<b>6.90%</b>	<b>7.25%</b>
Number of active members	227,926	231,032
Annual earnable compensation	\$ 12,728,936	\$ 12,737,375
Number of retired members and beneficiaries	139,865	135,678
Annual allowances	\$ 5,499,796	\$ 5,253,005
Assets:		
Fair value	\$ 102,146,688	\$ 81,161,558
Actuarial value	94,048,970	81,632,571
Unfunded actuarial accrued liability	\$ 21,654,597	\$ 25,556,204
Blended amortization period (years)	22.6	24.2
Funded ratio based on Actuarial Value of Assets	81.3%	76.2%
<b>Contributions for Fiscal Year Ending</b>	<b>June 30, 2024</b>	<b>June 30, 2023</b>
Member contribution rate	6.00%	6.00%
Actuarially Determined Employer Contribution Rates (ADEC):		
Normal*	8.66%	7.35%
Unfunded actuarial accrued liability	<u>11.32</u>	<u>12.63</u>
Total	19.98%	19.98%

\* The normal contribution includes administrative expenses of 0.20% of payroll.

2. The valuation takes into account the effect of amendments of the System enacted through the 2021 session of the General Assembly. The major benefit and contribution provisions of the System as reflected in the current valuation are summarized in Schedule H. There have been no changes since the previous valuation.
3. Comments on the valuation results as of June 30, 2021 are given in Section IV and further discussion of the employer contribution levels is provided in Section V.



## Section I – Summary of Principal Results

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4. Since the previous valuation, the assumed annual rate of return on investments has been decreased from 7.25% to 6.90%, and the payroll growth assumption has been decreased from 3.00% to 2.50%. Schedule D of this report outlines the full set of actuarial assumptions and asset method used to prepare the current valuation.
5. The entry age actuarial cost method was used to prepare the valuation. Schedule E contains a brief description of this method.
6. The funded ratio shown in the Summary of Principal Results is the ratio of the actuarial value of assets to the accrued liability and would be different if based on fair value of assets. The funded ratio is an indication of progress in funding the promised benefits. Since the ratio is less than 100%, there is a need for additional contributions toward payment of the unfunded actuarial accrued liability. In addition, this funded ratio does not have any relationship to measuring sufficiency if the plan had to settle its liabilities.





## Section II – Membership

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1. The data we received for the 2021 valuation was provided by the Retirement System. While not verifying the data at its source, we performed tests for consistency and reasonableness.
2. The following table shows the number of teachers and their annual earnable and average compensation as of June 30, 2021 on whose account benefits may be payable under the Retirement System. The annual compensation for each active member was provided by the Retirement System and was used without adjustment.

**THE NUMBER AND ANNUAL EARNABLE AND AVERAGE COMPENSATION  
OF ACTIVE MEMBERS AS OF JUNE 30, 2021**

<b>TOTAL NUMBER</b>	<b>ANNUAL COMPENSATION (\$1,000's)</b>	<b>AVERAGE COMPENSATION</b>
227,926	\$12,728,936	\$55,847



## Section II – Membership

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3. The following table shows the number of beneficiaries on the roll as of June 30, 2021, together with the amount of their annual retirement allowances payable under the System as of that date.

**THE NUMBER AND ANNUAL RETIREMENT ALLOWANCES  
OF BENEFICIARIES ON THE ROLL AS OF JUNE 30, 2021**

<b>GROUP</b>	<b>NUMBER</b>	<b>ANNUAL RETIREMENT ALLOWANCES (\$1,000's)</b>
Service Retirements	125,660	\$ 5,135,105
Disability Retirements	4,622	111,659
Beneficiaries of Deceased Active and Retired Members	<u>9,583</u>	<u>253,032</u>
Total	139,865	\$ 5,499,796

4. In addition, the results of the valuation include liabilities for 122,081 terminated employees not yet receiving benefits.



## Section III – Assets

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1. The retirement law provides for the maintenance of two funds for the purpose of recording the financial transactions of the System; namely, the Annuity Savings Fund and the Pension Accumulation Fund.

- (a) ***Annuity Savings Fund***

The Annuity Savings Fund is the fund to which are credited all contributions made by members together with regular interest thereon. When a member retires, or if a death benefit allowance becomes payable to his beneficiary, his accumulated contributions are transferred from the Annuity Savings Fund to the Pension Accumulation Fund. The annuity which these contributions provide is then paid from the Pension Accumulation Fund. On June 30, 2021, the value of assets credited to the Annuity Savings Fund amounted to \$10,787,139,000.

- (b) ***Pension Accumulation Fund***

The Pension Accumulation Fund is the fund to which all income from investments and all contributions made by employers of members of the System and by the State for members of local retirement funds are credited. All retirement allowance and death benefit allowance payments are disbursed from this fund. Upon the retirement of a member, or upon his death if a death benefit allowance is payable, his accumulated contributions are transferred from the Annuity Savings Fund to this fund to provide the annuity portion of the allowance. On June 30, 2021, the fair value of assets credited to the Pension Accumulation Fund amounted to \$91,359,549,000.

2. As of June 30, 2021, the total fair value of assets amounted to \$102,146,688,000 as reported by the auditor of the System. The actuarial value of assets as of June 30, 2021 was determined to be \$94,048,970,000 based on a 5-year smoothing of investment gains and losses. The smoothing method has been modified for the June 30, 2021 valuation, in order to mitigate the impact of the assumption and methodology changes, and to take advantage of the annual return on fair value of assets of 29.2% during the fiscal year ending June 30, 2021. The amount of the substantial asset gain recognized this year was an amount such that the total UAAL was the same as if no assumptions or methods had been changed. The remaining unrecognized asset gain will be spread equally over the four-year period following this valuation. Schedule B shows the development of the actuarial value of assets.



## Section III – Assets

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3. Schedule C shows receipts and disbursements of the System for the two years preceding the valuation date and a reconciliation of the fund balances at fair value.



## Section IV – Comments on Valuation

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1. Schedule A of this report contains the valuation balance sheet which shows the present and prospective assets and liabilities of the System as of June 30, 2021 (all amounts are in thousands).
2. The valuation balance sheet shows that the System has total liabilities of \$129,914,906, of which \$68,862,439 is for the prospective benefits payable on account of present retired members and beneficiaries of deceased members and \$61,052,467 is for the prospective benefits payable on account of present active and inactive members and members entitled to deferred vested benefits. Against these liabilities, the System has total present assets for valuation purposes of \$94,048,970 as of June 30, 2021. The difference of \$35,865,936 between the total liabilities and the total present assets represents the present value of contributions to be made in the future. Of this amount, \$5,958,411 is the present value of future contributions expected to be made by members to the Annuity Savings Fund, and the balance of \$29,907,525 represents the present value of future contributions payable by the employer.
3. The employer contributions to the System consist of normal contributions and unfunded actuarial accrued liability (UAAL) contributions. The valuation indicates that employer normal contributions at the rate of 8.66% of payroll are required, in addition to member contributions, to provide the benefits of the System for the average new member.
4. Prospective normal contributions, excluding administrative expenses, have a present value of \$8,252,928. When this amount is subtracted from \$29,907,525, which is the present value of the total future contributions to be made by the employer, there remains \$21,654,597 as the amount of future UAAL contributions.
5. The funding policy of the Board, as shown in Schedule F, provides that the UAAL as of June 30, 2021 (Transitional UAAL) will be amortized as a level percent of pay over a closed period equal to an amortization period not to exceed 23 years as of June 30, 2021. In each subsequent valuation all benefit changes, assumption and method changes and experience gains and/or losses that have occurred since the previous valuation will determine a New Incremental UAAL.



## Section IV – Comments on Valuation

Each New Incremental UAAL will be amortized as a level percent of payroll over a closed 25-year period from the date it is established.

6. The total UAAL contribution rate is 11.32% of payroll, determined in accordance with the Board's funding policy. The UAAL contribution rate has been calculated on the assumption that the aggregate amount of the accrued liability contribution will increase by 2.50% each year.
7. Schedule G of this report shows the amortization schedules for the Transitional UAAL and New Incremental UAALs.
8. The following table shows the components of the total UAAL and the derivation of the UAAL contribution rate in accordance with the funding policy:

**TABLE 4**  
**TOTAL UAAL AND UAAL CONTRIBUTION RATE**  
(Dollar amounts in thousands)

	<u>UAAL</u>	<u>REMAINING AMORTIZATION PERIOD (YEARS)</u>	<u>AMORTIZATION PAYMENT</u>
Transitional 6/30/2021	<u>\$21,654,597</u>	22.6	<u>\$1,553,767</u>
Total UAAL	\$21,654,597		\$1,553,767
Amortization payment adjusted for timing			\$1,501,950
Blended amortization period (years)			22.6
Estimated payroll			\$13,266,565
UAAL contribution rate			11.32%



## Section V – Contributions Payable by Employers

1. The Teachers Retirement System funding policy provides for periodic employer contributions at rates which, expressed as a percent of annual covered payroll, are sufficient to provide resources to pay benefits when due without being increased for future generations of taxpayers.
2. The retirement law provides that the contributions of employers shall be a percentage of the compensation of active members consisting of a normal contribution rate and an unfunded actuarial accrued liability (UAAL) contribution rate as determined by actuarial valuation.
3. Normal contributions include 0.20% of compensation that is required to meet the expenses of administering the System.
4. Based on the total employer contribution rate of 19.98% of payroll, the UAAL contribution rate is 11.32% of payroll, which will amortize the UAAL in accordance with the Board's funding policy.
5. The following table summarizes the employer contribution rates, which were determined by the June 30, 2021 valuation and are recommended for use.

### ACTUARIALLY DETERMINED EMPLOYER CONTRIBUTION RATES (ADEC) FOR FISCAL YEAR ENDING JUNE 30, 2024

CONTRIBUTION	PERCENTAGE OF ACTIVE MEMBERS' COMPENSATION
Normal	8.66%
Unfunded Actuarial Accrued Liability	<u>11.32</u>
Total	19.98%



## Section VI – Accounting Information

The information required under Governmental Accounting Standard Board (GASB) Statements No. 67 and No. 68 will be issued in separate reports. The following information is provided for informational purposes only.

1. The following is a distribution of the number of employees by type of membership:

### NUMBER OF ACTIVE AND RETIRED MEMBERS AS OF JUNE 30, 2021

GROUP	NUMBER
Retirees and beneficiaries currently receiving benefits	139,865
Terminated employees not yet receiving benefits	122,081
Active plan members	<u>227,926</u>
Total	<u>489,872</u>

2. The schedule of funding progress is shown below.

### SCHEDULE OF FUNDING PROGRESS (Dollar amounts in thousands)

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) - Entry Age (b)	Unfunded AAL (UAAL) (b - a)	Funded Ratio (a / b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll ((b - a) / c)
6/30/2016	\$68,161,710	\$91,721,775	\$23,560,065	74.3%	\$10,783,277	218.5%
6/30/2017	71,212,660	95,981,031	24,768,371	74.2	11,333,997	218.5
6/30/2018	75,024,364	96,905,253	21,880,889	77.4	11,704,334	186.9
6/30/2019*	78,126,922	101,839,399	23,712,477	76.7	11,882,828	199.6
6/30/2020	81,632,571	107,188,775	25,556,204	76.2	12,737,375	200.6
6/30/2021*	94,048,970	115,703,567	21,654,597	81.3	12,728,936	170.1

\* Reflects change in assumptions





## Section VI – Accounting Information

3. The following shows the schedule of employer contributions.

<u>Year Ending</u>	<u>Actuarially Determined Employer Contribution (ADEC)</u>	<u>Percentage Contributed</u>
6/30/2016	\$ 1,580,532	100%
6/30/2017	1,654,844	100
6/30/2018	2,018,724	100
6/30/2019	2,566,403	100
6/30/2020	2,738,818	100
6/30/2021	2,495,527	100

4. The information presented above was determined as part of the actuarial valuation at June 30, 2021. Additional information as of the latest actuarial valuation follows.

Valuation date	6/30/2021
Actuarial cost method	Entry age
Amortization method	Level percent of pay, closed
Remaining amortization period	22.6 years
Asset valuation method	5-year smoothed fair market value
Actuarial assumptions:	
Investment rate of return (discount rate)*	6.90%
Projected salary increases*	3.00 – 8.75%
Cost-of-living adjustments	1.5% semi-annually

\* Includes inflation at 2.50%



## Section VII – Experience

- Section 47-3-23 of the act governing the operation of the System provides that as an aid to the Board in adopting service and mortality tables, the actuary will prepare an experience investigation at least once in each 5-year period. The last investigation was prepared for the 5-year period ending June 30, 2018, and based on the results of the investigation, new rates of separation and mortality were adopted by the Board on May 13, 2020. The next experience investigation will be prepared for the 5-year period July 1, 2018 through June 30, 2023.
- The following table shows the estimated gain or loss from various factors that resulted in a decrease of \$3,901,607,000 in the unfunded actuarial accrued liability from \$25,556,204,000 to \$21,654,597,000 during the fiscal year ending June 30, 2021.

**ANALYSIS OF THE CHANGE IN UNFUNDED ACTUARIAL ACCRUED LIABILITY**  
(Dollar amounts in millions)

ITEM	AMOUNT OF INCREASE/ (DECREASE)
Interest (7.25%) added to previous UAAL	\$ 1,852.8
Accrued liability contribution	(1,681.3)
Experience (Gain)/Loss:	
Valuation asset growth	(8,785.7)
Pensioners' mortality	(112.5)
Turnover and retirements	347.8
New entrants and Rehires	152.2
Salary increases	(740.3)
Assumption and Method changes	4,913.9
Miscellaneous	<u>151.5</u>
Total Change in UAAL	\$ <u>(3,901.6)</u>



## Section VII – Experience

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3. The following is a brief description of the items contributing to the change in the unfunded actuarial accrued liability (UAAL) for the year:

Interest: The increase in the UAAL due to interest based on the assumed rate in effect for the year was \$1,852.8 million (7.25% assumed for July 1, 2020 through June 30, 2021).

Accrued Liability Contribution: The decrease due to the contribution made during the year that was allocated to amortization of the UAAL was \$1,681.3 million. This is the portion of the total employer contribution received during the year in excess of the employer normal cost.

Valuation Asset Growth: The decrease in the UAAL due to valuation asset growth recognized for the year ending June 30, 2021, was \$8,785.7 million. This gain represents the difference between the expected actuarial value of assets and the actual actuarial value of assets plus the immediate recognition of \$4,913.9 million necessary to offset the impact of the reduction to the assumed discount rate. The expected actuarial value of assets is determined by adding the actuarial value of assets from the prior valuation, non-investment related cash flow during the year and interest expected to be earned during the year at the assumed rate (7.25%). The estimated return on actuarial value of assets is 18.16% for the fiscal year ending June 30, 2021.

Pensioner Mortality: The decrease in the UAAL due to pensioner mortality for the year was \$112.5 million. This is primarily due to more members dying during the year than anticipated based on the mortality tables adopted by the Board.

Turnover and Retirements: There was an increase in the UAAL due to turnover and retirements during the year of \$347.8 million. This loss primarily occurred because the number of actual terminations was less than expected based on the assumed probabilities adopted by the Board. In addition, this item includes the impact of benefits for new retired members that were greater than anticipated based on the prior year's valuation data (this includes unexpected service increases due to sick leave conversion and service purchase and unanticipated salary increases in the year of retirement).

New Entrants: The increase in the liability due to new entrants was \$152.2 million. This represents the accrued liability at the valuation date for new entrants hired during the year. This also includes members who returned to service with prior service credit.

Salary Increases: There was a decrease in the UAAL of \$740.3 million because the salary increases actually received by active members during the year were less than those anticipated based on the assumed salary increase rates adopted by the Board.

Assumption and Method Changes: There was an increase in the UAAL of \$4,913.9 million due to the change in the discount rate from 7.25% to 6.90%.

Miscellaneous: Other items contributing to the change in the UAAL totaled to an increase in the UAAL of \$151.5 million. This includes all gains or losses not specified above. One such item is the loss that occurred for members who purchased service at less than full actuarial cost (such as withdrawn service). Another item is a loss that occurred because the data received to prepare the valuation was different than expected from the previous year (items such as birth dates or service for active members and birth dates, options, or benefit amounts for retired members)



## Section VIII – Risk Assessment

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### **Overview**

Actuarial Standards of Practice (ASOP) No. 51, issued by the Actuarial Standards Board, provides guidance on assessing and disclosing risks related to pension plan funding. This guidance is binding on all credentialed actuaries practicing in the United States. This standard was issued as final in September 2017 with application to measurement dates on or after November 1, 2018.

The term “risk” frequently has a negative connotation, but from an actuarial perspective, it may be thought of as simply the fact that what actually happens in the real world will not always match what was expected, based on actuarial assumptions. Of course, when actual experience is better than expected, the favorable risk is easily absorbed. The risk of unfavorable experience will likely be unpleasant, and so there is an understandable focus on aspects of risk that are negative.

Risk usually can be reduced or eliminated at some cost. Consumers, for example, buy auto and home insurance to reduce the risk of accidents or catastrophes. Another way to express this concept, however, is that there is generally some reward for assuming risk. Thus, retirement plans invest not just in US Treasury bonds which have almost no risk, but also in equities which are considerably riskier – because they have an expected reward of a higher return that justifies the risk.

Under ASOP 51, the actuary is called on to identify the significant risks to the pension plan and provide information to help those sponsoring and administering the plan understand the implications of these risks. In this section, we identify some of the key risks for the System and provide information to help interested parties better understand these risks.



## Section VIII – Risk Assessment

### Investment Risk

The investment return on assets is the most obvious risk – and usually the largest risk – to funding a pension plan. To illustrate the magnitude of this risk, the following chart shows the Asset Volatility Ratio (AVR), defined as the fair value of assets divided by covered payroll.

(\$ in thousands)

Valuation	Fair Value of Assets	Covered Payroll	Asset Volatility Ratio
2016	\$65,552,411	\$10,783,277	6.08
2017	\$71,340,972	\$11,333,997	6.29
2018	\$75,532,925	\$11,704,334	6.45
2019	\$78,788,937	\$11,882,828	6.63
2020	\$81,161,558	\$12,737,375	6.37
2021	\$102,146,688	\$12,728,936	8.02

The asset volatility ratio is especially useful to compare across plans or through time. It is also frequently useful to consider how the AVR translates into changes in the Required Contribution Rate (actuarially determined employer contribution rate). For example, in the table below with an AVR of 7.0, if the market value return is 10% below assumed, or negative 3.10% (6.90% minus 10.00%) for the System, there will be an increase in the Required Contribution Rate of 0.92% of payroll in the first year. Without asset smoothing or without returns above the expected return in the next four years, the impact on the Required Contribution Rate would be 4.62%. A higher AVR would produce more volatility in the Required Contribution Rate.

AVR	Unsmoothed Amortization	Smoothed Amortization
6.0	3.96%	0.79%
7.0	4.62%	0.92%
8.0	5.28%	1.06%



## Section VIII – Risk Assessment

### Sensitivity Measures

Valuations are generally performed with a single set of assumptions that reflects the best estimate of future conditions, in the opinion of the actuary and typically the governing board. Note that under actuarial standards of practice, the set of economic assumptions used for funding must be consistent. To enhance the understanding of the importance of an assumption, a sensitivity test can be performed where the valuation results are recalculated using a different assumption or set of assumptions.

The following tables contains the key measures for the System using the valuation assumption for investment return of 6.90%, along with the results if the assumption were 5.90% or 7.90%. In this analysis, only the investment return assumption is changed. Consequently, there may be inconsistencies between the investment return and other economic assumptions such as inflation or payroll increases. In addition, simply because the valuation results under alternative assumptions are shown here, it should not be implied that CMC believes that either assumption (5.90% or 7.90%) would comply with actuarial standards of practice.

(\$ in thousands)

As of June 30, 2021	Current Discount Rate (6.90%)	-1% Discount Rate (5.90%)	+1% Discount Rate (7.90%)
Accrued Liability	\$115,703,567	\$131,860,423	\$102,521,849
Unfunded Liability	\$21,654,597	\$37,811,453	\$8,472,878
Funded Ratio (AVA)	81.3%	71.3%	91.7%
ADEC Rate*	19.98%	30.96%	10.38%

\* Contribution rates are determined based on the Board's Funding Policy



## Section VIII – Risk Assessment

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### ***Mortality Risk***

The mortality assumption is a significant assumption for valuation results, second only to the investment assumption in most situations. The System's mortality assumption utilizes a mortality table (with separate rates for males and females, as well as different rates by status) and a generational projection scale to build in an expected degree of improvement to the member's mortality experience through time.

The future, however, is not known, and actual mortality improvements may occur at a faster rate than expected, or at a slower rate than expected. Although changes in mortality will affect the benefits paid, this assumption is carefully studied during the regular experience studies that the System conducts so that incremental changes can be made to smoothly reflect emerging experience. The risk to the System due to mortality is significantly reduced due to the use of the generational improvement method.

### ***Contribution Risk***

The System is primarily funded by member and employer contributions to the trust fund, together with the earnings on those accumulated contributions. Each year in the valuation, the Actuarial Determined Employer Contribution (ADEC) rate is determined, based on the System's funding policy. This rate is the sum of the rates for the normal cost for the plan (which includes expected administrative expenses), and the rate necessary to amortize the UAAL. Since the level percentage of payroll method is utilized to determine the UAAL amortization amounts, there is an expectation that future payments will grow at the assumed 3.00% annual rate of increase in covered payroll. If payroll grows at a slower rate, under this amortization method, less than expected UAAL amortization payments would result in a greater UAAL in future years and may require increases to either the amortization rate or the amortization period. From a policy perspective, since the ADEC rate has always been made by the plan sponsors, and that procedure is expected to continue, there is no risk to the System associated with the contribution amounts being less than the ADEC.



## Schedule A – Valuation Balance Sheet

THE PRESENT AND PROSPECTIVE ASSETS AND LIABILITIES OF  
THE TEACHERS RETIREMENT SYSTEM OF GEORGIA  
AS OF JUNE 30, 2021  
(Dollar amounts in thousands)

<u>ASSETS</u>	
Actuarial value of assets	\$ 94,048,970
Present value of future member contributions to Annuity Savings Fund	5,958,411
Present value of future employer contributions to the Pension Accumulation Fund:	
Normal contributions	\$ 8,252,928
Unfunded actuarial accrued liability contributions	<u>21,654,597</u>
Total Prospective Employer Contributions	<u>29,907,525</u>
Total Assets	<u>\$ 129,914,906</u>
<u>LIABILITIES</u>	
Present value of prospective benefits payable on account of present retired members and beneficiaries of deceased members	\$ 68,862,439
Present value of prospective benefits payable on account of present active and inactive members and members entitled to deferred vested benefits	<u>61,052,467</u>
Total Liabilities	<u>\$ 129,914,906</u>





## Schedule B – Development of Actuarial Value of Assets

(Dollar amounts in thousands)

(1)	Actuarial Value Beginning of Year	\$ 81,632,571
(2)	Fair Value End of Year	102,146,688
(3)	Fair Value Beginning of Year	81,161,558
(4)	Cash Flow	
	(a) Contributions	3,312,617
	(b) Benefit Payments	5,503,580
	(c) Administrative Expenses	16,668
	(d) Investment Expenses	<u>64,404</u>
	(e) Net: (4)(a) - (4)(b) - 4(c) - 4(d)	(2,272,035)
(5)	Investment Income	
	(a) Fair Total: (2) - (3) - (4)(e)	23,257,165
	(b) Assumed Rate	7.25%
	(c) Amount for Immediate Recognition: [(3) x (5)(b)] + [(4)(a) - (4)(b) - 4(c)] x (5)(b) x 0.5 + (4)(d) + \$6,142,403 to offset change in discount rate*	12,010,993
	(d) Amount for Phased-In Recognition: 5(a) - (5)(c)	11,246,172
(6)	Phased-In Recognition of Investment Income	
	(a) Current Year	2,249,234
	(b) First Prior Year	(305,852)
	(c) Second Prior Year	(88,300)
	(d) Third Prior Year	194,938
	(e) Fourth Prior Year	<u>627,421</u>
	(f) Total Recognized Investment Gain	2,677,441
(7)	Preliminary Value End of Year: (1) + (4)(e) + 5(c) + (6)(f)	<u>\$ 94,048,970</u>
(8)	Corridor	
	(a) 75% of Fair Value: 0.75 x (2)	\$ 76,610,016
	(b) 125% of Fair Value: 1.25 x (2)	\$ 127,683,360
(9)	Actuarial Value End of Year: (7), but not less than (8)(a) and not greater than (8)(b)	\$ 94,048,970
(10)	Difference Between Fair & Actuarial Values: (2) - (9)	\$ 8,097,718
(11)	Rate of Return on Actuarial Value**	18.16%

\* The amount for immediate recognition this year was the amount such that the total UAAL was the same as if no assumptions or methods has been changed.

\*\* Calculated assuming mid-year cash flow



## Schedule C – Summary of Receipts and Disbursements

(Dollar amounts in thousands)

	YEAR ENDING	
	June 30, 2021	June 30, 2020
<u>Receipts for the Year</u>		
Contributions:		
Member	\$ 817,090	\$ 800,864
Employer	2,490,404	2,733,089
Non-Employer	<u>5,123</u>	<u>5,729</u>
Subtotal	\$ 3,312,617	\$ 3,539,682
Investment Income (Net of Investment Expenses)	1,606,368	1,681,437
Unrealized Appreciation/(Depreciation)	<u>21,586,393</u>	<u>2,438,172</u>
TOTAL	\$ 26,505,378	\$ 7,659,291
<u>Disbursements for the Year</u>		
Benefit Payments	\$ 5,434,414	\$ 5,192,283
Refunds to Members	69,166	76,976
Administrative Expenses	<u>16,668</u>	<u>17,411</u>
TOTAL	\$ 5,520,248	\$ 5,286,670
<u>Excess of Receipts over Disbursements</u>	\$ 20,985,130	\$ 2,372,621
<u>Reconciliation of Asset Balances</u>		
Asset Balance as of the Beginning of Year (Fair Value)	\$ 81,161,558	\$ 78,788,937
Excess of Receipts over Disbursements	<u>20,985,130</u>	<u>2,372,621</u>
Asset Balance as of the End of Year (Fair Value)	<u>\$ 102,146,688</u>	<u>\$ 81,161,558</u>
Rate of Return on Fair Value	29.2%	5.4%



## Schedule D – Outline of Actuarial Assumptions & Methods

All assumptions, with the exception of the discount rate, payroll growth and the inflation component of the rates of salary increases, were adopted by the Board on May 13, 2020.

INVESTMENT RATE OF RETURN (Discount Rate): 6.90% per annum, net of investment expenses, compounded annually (including inflation of 2.50%).

### SALARY INCREASES\*:

<u>Service</u>	<u>Annual Rate</u>	<u>Service</u>	<u>Annual Rate</u>	<u>Service</u>	<u>Annual Rate</u>
0	8.75 %	7	4.25 %	14	3.25 %
1	7.25	8	3.75	15	3.25
2	5.75	9	3.75	16	3.00
3	5.25	10	3.50	17	3.00
4	5.00	11	3.50	18	3.00
5	5.00	12	3.50	19	3.00
6	5.00	13	3.50	20 or more	3.00

\*includes price inflation component of 2.50%

### SERVICE RETIREMENT:

<u>AGE</u>	<u>Annual Rate</u>			
	<u>Male</u>		<u>Female</u>	
	<u>Less than 30 years of service</u>	<u>30 or more years of service*</u>	<u>Less than 30 years of service</u>	<u>30 or more years of service**</u>
50	3.00 %	52.00 %	2.75 %	50.00 %
55	5.00	37.00	5.75	35.00
60	20.00	34.00	25.00	40.00
61	18.00	30.00	25.00	40.00
62	25.00	35.00	25.00	43.00
63	22.00	28.00	25.00	43.00
64	22.00	28.00	24.00	43.00
65	27.00	27.00	32.00	32.00
66	32.00	32.00	32.00	32.00
67	30.00	30.00	32.00	32.00
68	30.00	30.00	30.00	30.00
69	30.00	30.00	30.00	30.00
70	30.00	30.00	30.00	30.00

\*An additional 10% are assumed to retire at 30 years of service for ages between 50 and 64.

\*\*An additional 15% are assumed to retire at 30 years of service for ages between 50 and 61.



## Schedule D – Outline of Actuarial Assumptions & Methods

### SEPARATION BEFORE SERVICE RETIREMENT:

Age	Death*	Disability	Annual Rate of		
			Withdrawal		
			Years of Service		
			0-4	5-9	10+
<b>Male</b>					
20	0.0375%	-	27.00%	-	-
25	0.0336	-	17.00	13.00%	-
30	0.0437	-	14.00	6.50	6.00%
35	0.0549	0.0165%	14.00	6.25	3.50
40	0.0714	0.0275	13.00	6.25	2.75
45	0.1087	0.0720	13.00	6.00	2.50
50	0.1799	0.1360	11.25	5.75	2.75
55	0.2828	0.2400	11.75	5.50	3.25
60	0.4441	-	12.00	6.00	-
64	0.6475	-	15.00	7.50	-
<b>Female</b>					
20	0.0139%	-	28.00%	-	-
25	0.0148	-	13.50	12.00%	-
30	0.0235	-	13.50	7.00	6.00%
35	0.0345	0.0152%	13.00	7.00	4.00
40	0.0493	0.0312	12.00	6.50	3.00
45	0.0728	0.0650	10.75	6.00	2.50
50	0.1107	0.1400	10.75	5.50	3.00
55	0.1687	0.3400	10.75	5.00	3.00
60	0.2554	-	11.50	5.50	-
64	0.3665	-	15.00	7.50	-

\* The Pub-2010 Teachers Headcount Weighted Below Median Employee mortality table with ages set forward one year and adjusted 106% is used for death prior to retirement. Future improvement in mortality rates is assumed using the MP-2019 projection scale generationally. These rates of improvement have been reduced by 20% for all years prior to the ultimate rate. The proposed rates shown above are based on a projection to 2015. Actual mortality rates would be projected generationally.



## Schedule D – Outline of Actuarial Assumptions & Methods

DEATHS AFTER RETIREMENT: The Pub-2010 Teachers Headcount Weighted Below Median Healthy Retiree mortality table (ages set forward one year and adjusted 106%) with the MP-2019 Projection scale applied generationally is used for death after service retirement and beneficiaries. The rates of improvement have been reduced by 20% for all years prior to the ultimate rate. The Pub-2010 Teachers Mortality Table for Disabled Retirees (ages set forward one year and adjusted 106%) with the MP-2019 Projection scale applied generationally is used for death after disability retirement. The rates of improvement have been reduced by 20% for all years prior to the ultimate rate. The representative rates shown below are based on a projection to 2015. Actual mortality rates are projected generationally to the year of the measurement.

Age	Annual Rate of Death After			
	Service Retirement*		Disability Retirement*	
	Men	Women	Men	Women
40	0.0714%	0.0493%	0.8444%	0.7386%
45	0.1087	0.0728	1.2146	1.1004
50	0.1799	0.1107	1.8432	1.6181
55	0.5241	0.3901	2.4790	1.9679
60	0.6440	0.4136	3.0569	2.2548
65	0.8433	0.5260	3.7177	2.6170
70	1.4580	0.9329	4.6328	3.3740
75	2.7028	1.7905	6.1798	4.7842
80	4.9635	3.4310	8.8648	7.2311
85	9.0522	6.5905	13.0223	11.2015
90	16.0712	12.3050	18.8001	16.0832
95	26.1186	21.7258	27.0439	22.7586

\*Rates as of 2015

COST OF LIVING: Increases of 1.5% semi-annually.

PAYROLL GROWTH ASSUMPTION: 2.50%

ADMINISTRATIVE EXPENSES: 0.20% of active members' payroll included in normal contribution.

ASSET METHOD: Actuarial Value, as developed in Schedule B. The actuarial value of assets recognizes a portion of the difference between the fair value of assets and the expected fair value of assets, based on the investment rate of return. The amount recognized each year will be based on 5-year smoothing of assets, where 20% of the difference between fair value and expected fair value will be recognized each year. The actuarial value of assets is limited to a range between 75% and 125% of the fair value of assets.

PERCENTAGE MARRIED: 100% of active members were assumed to be married with the husband 4 years older than his wife.

UNUSED SICK LEAVE: 1.50% for members who retire on early retirement and for members who retire with unreduced retirement before 30 years of service and a 2.00% load for members who retire with 30 or more years of service.

TERMINATING VESTED MEMBERS: Prior to age 50, 30% of active vested members who terminate are assumed to elect a refund in lieu of a benefit; on or after age 50, 20% of active vested members who terminate are assumed to elect a refund in lieu of a benefit. Benefits are assumed to begin at age 60.



## Schedule E – Actuarial Cost Method

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1. The valuation is prepared on the projected benefit basis, under which the present value, at the interest rate assumed to be earned in the future (currently 6.90%), of each active member's expected benefit at retirement or death is determined, based on his age, service, sex, and compensation. The calculations take into account the probability of a member's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of his terminating with a service, disability, or survivor's benefit. Future salary increases and post-retirement cost-of-living adjustments are also anticipated. The present value of the expected benefits payable on account of the active members is added to the present value of the expected future payments to retired members and beneficiaries and inactive members to obtain the present value of all expected benefits payable from the System on account of the present group of members and beneficiaries.
2. The employer contributions required to support the benefits of the System are determined following a level funding approach and consist of a normal contribution and an accrued liability contribution.
3. The normal contribution is determined using the "entry age normal" method. Under this method, a calculation is made to determine the uniform and constant percentage rate of employer contribution which, if applied to the compensation of the average new member during the entire period of his anticipated covered service, would be required in addition to the contributions of the member to meet the cost of all benefits payable on his behalf.
4. The unfunded actuarial accrued liability is determined by subtracting the present value of prospective employer normal contributions and member contributions, together with the current actuarial value of assets held, from the present value of expected benefits to be paid from the System.



## Schedule F – Funding Policy

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The purpose of the funding policy is to state the overall funding objectives for the Teachers Retirement System of Georgia (the “System”), the benchmarks that will be used to measure progress in achieving those goals, and the methods and assumptions that will be employed to develop the benchmarks. It is intended that the funding policy will remain unchanged until the objectives below are met.

### I. Funding Objectives

The goal in requiring employer and member contributions to the System is to accumulate sufficient assets during a member’s employment to fully finance the benefits the member is expected to receive throughout retirement. In meeting this objective, the System will strive to meet the following funding objectives:

- To develop a pattern of contribution rates expressed as a percentage of member payroll as measured by valuations prepared in accordance with applicable State laws and the principles of practice prescribed by the Actuarial Standards Board.
- To maintain an increasing funded ratio (ratio of actuarial value of assets to actuarial accrued liabilities) that reflects a trend of improved actuarial condition. The long-term objective is to attain a 100% funded ratio over a reasonable period of future years.
- To maintain adequate asset levels to finance the benefits promised to members and to monitor the future demand for liquidity.
- To promote intergenerational equity for taxpayers with respect to contributions required for the benefits provided by the System.

### II. Measures of Funding Progress

To track progress in achieving the System’s funding objectives, the following measures will be determined annually as of the actuarial valuation date (with due recognition that a single year’s results may not be indicative of long-term trends):

#### **Funded ratio**

The funded ratio, defined as the actuarial value of assets divided by the actuarial accrued liability, should increase over time, before adjustments for changes in benefits, actuarial methods, and/or actuarial assumptions.

#### **Unfunded Actuarial Accrued Liability (UAAL)**

- Transitional UAAL - The UAAL established as of the initial valuation date for which this funding policy is adopted shall be known as the Transitional UAAL.
- New Incremental UAAL - Each subsequent valuation will produce a New Incremental UAAL consisting of all benefit changes, assumption and method changes and experience gains and/or losses that have occurred since the previous valuation.
- Total UAAL - In each valuation year, this is the sum of the remaining balance of the Transitional UAAL and the remaining balance of each New Incremental UAAL.

#### **UAAL Amortization Period**

- The Transitional UAAL will be amortized over a closed period equal to the amortization period determined in the valuation preceding the adoption of the funding policy not to exceed 23 years.
- Each New Incremental UAAL shall be amortized over a closed 25-year period.



## Schedule F – Funding Policy

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### Employer Contribution Rates

- Employer Normal Contribution Rate – the contribution rate determined as of the valuation date each year based on the provisions of Georgia Code Section 47-3-43.
- In each valuation subsequent to the adoption of this funding policy, the required employer contribution rate will be determined by the summation of the employer Normal Contribution Rate, a contribution rate for administrative expenses, the amortization rate for the Transitional UAAL and the individual amortization rate for each of the New Incremental UAAL bases.

### Stability of Employer Contribution Rates

The valuation methodology, including the amortization of the UAAL would be expected to maintain reasonably stable contribution rates. In each valuation, a single equivalent UAAL amortization period will be determined equal to the number of years that the sum of all of the individual amortization payments for the Transitional UAAL and each New Incremental UAAL determined above would be expected to fully amortize the Total UAAL. The employer contribution rate established in the prior valuation can be maintained provided that the payment of this rate results in a reduction from the prior valuation of at least one-year to the single equivalent UAAL amortization period.

### III. Methods and Assumptions

The annual actuarial valuations providing the measures to assess funding progress will utilize the actuarial methods and assumptions last adopted by the Board based upon the advice and recommendation of the System's actuary. These include the following primary methods and assumptions:

- The actuarial cost method used to develop the benchmarks will be the Entry Age Normal actuarial cost method.
- The long-term investment rate of return assumption will be based on the discount rate adopted by the Board of Trustees.
- The actuarial value of assets in subsequent valuations will be determined by recognizing the annual differences between actual and expected market value of assets over a 5-year period.

In order to insure the sufficiency of long-term funding of benefits, the annual employer contribution rate determined in each actuarial valuation shall not be less than the employer normal cost contribution rate plus a contribution rate for administrative expenses.

The actuary shall conduct an investigation into the System's experience at least every five years and utilize the results of the investigation to form the basis for recommended assumptions and methods.

### IV. Funding Policy Progress

The Board will periodically have actuarial projections of the valuation results performed to assess the current and expected future progress towards the overall funding goals of the System. These periodic projections will provide the expected valuation results over at least a 30-year period. The projected measures of funding progress and the recent historical trend provided in valuations will provide important information for the Board's assessment of the System's funding progress.





## Schedule G – Amortization of UAAL

### 2021 TRANSITIONAL UAAL (Dollar amounts in thousands)

Valuation Date	Balance of New Incremental UAAL 6/30/2021	Expected UAAL Contribution
6/30/2021	\$ 21,654,597	\$ 1,553,767
6/30/2022	21,594,997	1,592,611
6/30/2023	21,492,440	1,632,427
6/30/2024	21,342,992	1,673,237
6/30/2025	21,142,421	1,715,068
6/30/2026	20,886,179	1,757,945
6/30/2027	20,569,381	1,801,894
6/30/2028	20,186,774	1,846,941
6/30/2029	19,732,721	1,893,115
6/30/2030	19,201,164	1,940,442
6/30/2031	18,585,602	1,988,953
6/30/2032	17,879,055	2,038,677
6/30/2033	17,074,032	2,089,644
6/30/2034	16,162,496	2,141,885
6/30/2035	15,135,823	2,195,432
6/30/2036	13,984,762	2,250,318
6/30/2037	12,699,393	2,306,576
6/30/2038	11,269,075	2,364,241
6/30/2039	9,682,400	2,423,347
6/30/2040	7,927,139	2,483,930
6/30/2041	5,990,181	2,546,029
6/30/2042	3,857,475	2,609,679
6/30/2043	1,513,962	1,618,425
6/30/2044	0	0



## Schedule H – Summary of Main Plan Provisions

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### SUMMARY OF MAIN PLAN PROVISIONS AS INTERPRETED FOR VALUATION PURPOSES

The Teachers Retirement System of Georgia began operation as of January 1, 1945. The System is supported by the joint contributions of the members and their employers. All teachers employed by an agency of and within the State of Georgia are eligible for membership in the System. The State makes contributions for certain retired members of local funds and certain benefits are payable by the System to them or on their account.

The following summary describes the main benefit and contribution provisions of the System as interpreted for the valuation.

#### 1 - DEFINITIONS

"Prior service" means service rendered prior to January 1, 1945 for which credit is allowed. "Creditable service" means the sum of membership service and prior service. "Earnable compensation" means the full rate of compensation that would be payable to a member teacher if he worked the full normal working time and shall include compensation paid to a member by an employer from grants or contracts made by outside agencies with the employer. "Employer" means the State of Georgia, the county or independent board of education, the State Board of Education, the Board of Regents of the University System of Georgia, or any other agency of and within the State by which a teacher is paid.

#### 2 - BENEFITS

##### MEMBERS OF THE RETIREMENT SYSTEM

##### Service Retirement Benefit

###### Condition for Allowance

Any member may retire on a service retirement allowance upon the attainment of age 60 and the completion of 10 years of creditable service or upon the completion of 25 years of creditable service.



## Schedule H – Summary of Main Plan Provisions

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### Amount of Allowance

The service retirement allowance consists of:

- (a) An annuity which is the actuarial equivalent of the member's accumulated contributions at the time of his retirement; and
- (b) A pension which, together with the annuity, will provide a total annual allowance equal to 2.00% of the member's average annual compensation during the two consecutive years of his creditable service as a contributing member producing the highest such average, multiplied by the number of years of his creditable service limited to 40 years.

If the member has less than 30 years of creditable service and has not attained age 60 at the time of retirement, his allowance is reduced by the lesser of 1/12 of 7% for each month that retirement precedes age 60 or 7% for each year or fraction of a year by which the member has less than 30 years of creditable service at the time of retirement.

The minimum service retirement allowance is \$17 per month for each year of creditable service, not to exceed 40 years of such service.

In no event will a teacher who was a member on June 30, 1961 receive a smaller retirement allowance than he would have received under the benefit provisions of the System in effect on that date.

### Disability Retirement Benefit

#### Condition for Allowance

A disability retirement allowance is payable to any member who becomes permanently incapacitated, mentally, or physically, for the further performance of duty, after having rendered 10 or more years of creditable service.

#### Amount of Allowance

If a member qualifies for either service retirement or disability retirement and a service retirement calculation exceeds the amount that he would receive on disability, he shall receive a service retirement allowance. Otherwise, he receives a disability retirement allowance determined as a service retirement allowance on the basis of the member's creditable service and compensation up to the time of disability, but with no reduction for age.



## Schedule H – Summary of Main Plan Provisions

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### Death Benefit

**Condition for Allowance** A death benefit is payable on account of a member who dies after having completed 10 or more years of creditable service provided there is a named living beneficiary.

**Amount of Allowance** The death benefit is the amount which would have become payable to the member's beneficiary had the member retired on the date of his death on either a service retirement allowance or a disability retirement allowance, whichever is larger, and died after an election of Option 2 had become effective.

### Vesting Benefit

**Condition for Allowance** A member who withdraws from service prior to attaining age 60 after having rendered at least 10 years of creditable service and who elects to leave his accumulated contributions in the System is eligible for a vesting retirement allowance upon application therefore upon the attainment of age 60 or at any time thereafter.

**Amount of Allowance** The vesting allowance is determined as a service retirement allowance on the basis of the member's creditable service and compensation up to the time of withdrawal from service and on the basis of his age at the time the allowance commences.

**Return of Contributions Prior to Retirement** Upon a member's withdrawal from service or death prior to retirement, his accumulated contributions together with the accumulated interest are returned to him, or are paid to his designated beneficiary or estate, provided no other benefit is payable under the System.

**Return of Contributions After Retirement Under Maximum Plan** Benefits are payable to a member retired on service or disability for the remainder of his lifetime under the maximum plan. In the event total monthly benefits paid at the time of death are less than the contributions which the member made to the System, the difference between the benefits paid and the amount of contributions is refunded to the member's designated beneficiary or estate, provided no optional allowance has been selected.



## Schedule H – Summary of Main Plan Provisions

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### Optional Allowances

Upon retirement, any member may elect to convert the retirement allowance otherwise payable to him, except any additional pension payable under the minimum provision, to a reduced retirement allowance of equivalent actuarial value in one of the following optional forms:

Option 1. If he dies before receiving in annuity payments the amount of his accumulated contributions at retirement, the balance is paid to his designated beneficiary or to his estate; or

Option 2. Upon his death his reduced retirement allowance is continued throughout the life of and paid to his designated beneficiary; or

Option 2 Pop-up. A member may elect Option 2 with the added provision that in the event the designated beneficiary predeceases the member, the retirement allowance payable to the member after the designated beneficiary's death shall be equal to the retirement allowance which would have been payable had the member not elected the option; or

Option 3. Upon his death one-half of his reduced retirement allowance is continued throughout the life of and paid to his designated beneficiary; or

Option 3 Pop-up. A member may elect Option 3 with the added provision that in the event the designated beneficiary predeceases the member, the retirement allowance payable to the member after the designated beneficiary's death shall be equal to the retirement allowance which would have been payable had the member not elected the option; or

Option 4. A reduced retirement allowance payable during the life of the retired member, with the provision that upon his death some other benefit shall be payable; provided that the total value of such benefits is the actuarial equivalent of the retirement allowance he would have received without optional modification and provided the benefit is approved by the Board of Trustees; or

Option 5. A reduced retirement allowance together with a partial lump sum distribution not to exceed the sum of 36 months of the member's monthly retirement allowance that would have been payable if this option was not elected. This option may be elected with any other option described above. This option is not available to disability retirements or members subject to the minimum benefit formula.



## Schedule H – Summary of Main Plan Provisions

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### Cost-of-Living Adjustment

The retirement allowances of members or of any beneficiary of a member who died in service will be subject to adjustment as of each January 1 and July 1 based upon the change in the average CPI during the previous six-month period. The maximum increase in retirement allowances for any such six-month period will be 1-1/2%. If the CPI decreases, no reduction in allowance will be made for the first 2-1/2% of a reduction and retirement allowances will not be reduced below the amounts initially paid upon retirement.

In addition, for members who retired prior to January 1, 2013, a one-time 3% increase on the first \$37,500 of members' allowances is made at retirement. Members who retire on or after January 1, 2013 do not receive this increase.

A member who retires prior to age 60 with less than 30 years of creditable service is not eligible for post-retirement adjustments until such time as the member reaches age 60 or would have obtained 30 years of creditable service, whichever occurs earlier.

### 3 - CONTRIBUTIONS

#### By Members

Each member contributes 6.00% of his earnable compensation. However, no contributions are payable after the attainment of age 65 and the completion of 40 years of creditable service unless the member elects to continue to make contributions. Members may elect to cease making contributions after the completion of 40 years of creditable service.

#### By Employers

The employer contributes at a specified percentage of active member payroll determined annually by actuarial valuation.



## Schedule I – Tables of Membership Data

### THE NUMBER AND AVERAGE ANNUAL COMPENSATION OF ACTIVE MEMBERS BY AGE AND SERVICE AS OF JUNE 30, 2021

Age	Years of Service										Total
	Under 1	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 to 39	40 & Up	
Under 25	320	3,697	13								4,030
Avg. Pay	23,293	34,254	25,258								33,355
25 to 29	425	14,669	4,002	4							19,100
Avg. Pay	25,179	40,333	47,810	37,505							41,562
30 to 34	284	9,691	12,646	2,220	16						24,857
Avg. Pay	30,784	41,331	51,547	59,008	44,742						47,989
35 to 39	262	7,973	8,436	8,343	3,078	11					28,103
Avg. Pay	32,739	42,892	52,201	62,383	66,660	49,979					53,984
40 to 44	229	7,185	7,341	5,851	9,514	2,673	7				32,800
Avg. Pay	33,093	43,992	52,705	62,552	70,122	74,791	69,690				59,271
45 to 49	192	6,093	6,494	5,147	6,617	8,412	2,160	6			35,121
Avg. Pay	33,633	44,600	51,496	60,504	67,986	76,515	79,159	66,307			62,325
50 to 54	171	5,238	5,987	5,003	6,213	5,985	6,541	850	4		35,992
Avg. Pay	36,405	44,804	50,612	57,766	63,081	71,180	79,532	81,712	75,033		62,259
55 to 59	98	3,483	4,143	3,941	5,346	4,586	3,502	1,368	211		26,678
Avg. Pay	34,553	44,213	48,223	54,213	58,092	62,683	70,513	78,625	74,456		57,690
60 to 64	62	1,742	2,459	2,312	2,907	2,663	1,772	744	271	40	14,972
Avg. Pay	29,523	41,349	47,211	52,260	57,011	59,737	64,859	69,771	82,409	75,813	55,289
65 to 69	21	611	888	741	825	751	525	278	116	55	4,811
Avg. Pay	30,235	41,625	46,436	54,173	57,125	59,863	67,036	69,501	89,598	100,435	56,114
70 & up	4	218	273	208	225	197	149	97	43	48	1,462
Avg. Pay	49,208	33,629	43,219	47,991	57,960	56,323	67,296	74,266	79,195	124,538	54,760
Total Count	2,068	60,600	52,682	33,770	34,741	25,278	14,656	3,343	645	143	227,926
Avg. Pay	29,876	41,949	50,817	59,302	64,802	70,129	74,971	76,532	80,840	101,638	55,847

Average Age: 44.82

Average Service: 11.30



## Schedule I – Tables of Membership Data

### NUMBER OF RETIRED MEMBERS AND THEIR BENEFITS BY AGE

Age	Number of Members	Total Annual Benefits	Average Annual Benefits
Under 50	32	\$ 1,026,544	\$ 32,080
50 – 54	1,597	68,094,731	42,639
55 – 59	5,946	270,546,315	45,501
60 – 64	18,337	651,588,161	35,534
65 – 69	29,659	1,074,415,681	36,226
70 – 74	31,378	1,323,117,347	42,167
75 – 79	19,790	883,147,655	44,626
80 – 84	10,515	482,425,859	45,880
85 – 89	5,471	248,844,777	45,484
90 – 94	2,349	107,216,673	45,644
95 & Over	586	24,681,457	42,119
Total	125,660	\$ 5,135,105,200	\$ 40,865

### NUMBER OF BENEFICIARIES AND THEIR BENEFITS BY AGE

Age	Number of Members	Total Annual Benefits	Average Annual Benefits
Under 25	173	\$ 1,778,127	\$ 10,278
25 – 29	189	2,372,182	12,551
30 – 34	261	3,249,903	12,452
35 – 39	349	4,622,833	13,246
40 – 44	458	6,154,260	13,437
45 – 49	494	7,782,734	15,755
50 – 54	533	8,890,015	16,679
55 – 59	594	11,826,863	19,911
60 – 64	765	16,760,219	21,909
65 – 69	1,067	27,809,618	26,063
70 – 74	1,320	39,846,353	30,187
75 – 79	1,230	41,239,314	33,528
80 – 84	967	36,281,176	37,519
85 – 89	731	27,836,175	38,080
90 – 94	332	12,247,733	36,891
95 & Over	120	4,334,236	36,119
Total	9,583	\$ 253,031,741	\$ 26,404





## Schedule I – Tables of Membership Data

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### NUMBER OF DISABLED RETIREES AND THEIR BENEFITS BY AGE

Age	Number of Members	Total Annual Benefits	Average Annual Benefits
Under 50	234	\$ 4,228,861	\$ 18,072
50 – 54	398	8,697,426	21,853
55 – 59	732	15,888,448	21,706
60 – 64	997	22,783,569	22,852
65 – 69	904	22,261,902	24,626
70 – 74	712	19,823,987	27,843
75 – 79	364	10,202,426	28,029
80 – 84	176	4,810,695	27,333
85 – 89	67	1,952,850	29,147
90 – 94	29	792,184	27,317
95 & Over	9	217,118	24,124
Total	4,622	\$ 111,659,466	\$ 24,158



## Schedule J – Annual Comprehensive Financial Report Schedules

Active Members				
Fiscal Year	Number of Members	Annual Payroll (000's)	Average Pay	% Increase
2012	213,648	\$ 10,036,023	\$ 46,975	0.5%
2013	209,854	9,924,682	47,293	0.7%
2014	209,828	9,993,686	47,628	0.7%
2015	213,990	10,347,332	48,354	1.5%
2016	218,193	10,783,277	49,421	2.2%
2017	222,902	11,333,997	50,847	2.9%
2018	226,039	11,704,334	51,780	1.8%
2019	226,366	11,882,828	52,494	1.4%
2020	231,032	12,737,375	55,133	5.0%
2021	227,926	12,728,936	55,847	1.3%

Retirants and Beneficiaries								
Fiscal Year	Added to Roll		Removed from Roll		Roll – End of Year		% Increase In Annual Allowances	Average Annual Income
	Number of Members	Annual Allowances (000's)	Number of Members	Annual Allowances (000's)	Number of Members	Annual Allowances (000's)		
2012	7,055	\$ 298,471	1,915	\$ 55,565	97,317	\$ 3,345,513	7.8 %	\$ 34,377
2013	7,937	322,853	1,983	59,453	103,271	3,608,913	7.9	34,946
2014	7,078	291,066	2,195	68,324	108,154	3,831,655	6.2	35,428
2015	7,207	306,751	2,237	72,818	113,124	4,065,588	6.1	35,939
2016	7,225	312,063	2,392	80,359	117,957	4,297,292	5.7	36,431
2017	7,189	318,594	2,459	84,596	122,687	4,531,290	5.4	36,934
2018	7,345	341,242	2,732	98,829	127,300	4,773,703	5.3	37,500
2019	7,247	347,533	2,727	100,233	131,820	5,021,003	5.2	38,090
2020	6,894	346,319	3,036	114,317	135,678	5,253,005	4.6	38,717
2021	7,915	391,351	3,728	144,560	139,865	5,499,796	4.7	39,322



## Schedule J – Annual Comprehensive Financial Report Schedules

Solvency Test							
Fiscal Year	Aggregate Accrued Liabilities For			Actuarial Value of Assets (000's)	Portion of Accrued Liabilities Covered by Assets		
	(1) Active Member Contributions (000's)	(2) Retirants and Beneficiaries (000's)	(3) Active Members (Employer-Financed Portion) (000's)		(1)	(2)	(3)
2012	\$ 7,242,569	\$ 39,759,145	\$ 21,346,964	56,262,332	100.0%	100.0%	43.4%
2013	7,480,767	43,152,402	21,587,696	58,594,837	100.0	100.0	36.9
2014	7,815,630	45,841,742	22,114,745	62,061,722	100.0	100.0	38.0
2015	8,153,958	50,251,964	24,385,088	65,514,119	100.0	100.0	29.1
2016	8,522,267	55,186,998	28,012,510	68,161,710	100.0	100.0	15.9
2017	8,936,010	57,659,259	29,385,762	71,212,660	100.0	100.0	15.7
2018	9,350,031	58,993,494	28,561,728	75,024,364	100.0	100.0	23.4
2019	9,791,208	61,856,920	30,191,271	78,126,922	100.0	100.0	21.5
2020	10,320,195	64,144,338	32,724,242	81,632,571	100.0	100.0	21.9
2021	10,787,139	68,862,439	36,053,989	94,048,970	100.0	100.0	39.9