



# **Pennsylvania Public School Employees' Retirement System**

Actuarial Valuation Report  
June 30, 2021



September 28, 2022

Board of Trustees  
Pennsylvania Public School Employees'  
Retirement System  
5 North 5th Street  
Harrisburg, PA 17101

Ladies and Gentlemen:

This report presents the results of the annual actuarial valuation of the Pennsylvania Public School Employees' Retirement System (Retirement System or PSERS) as of June 30, 2021.

The valuation takes into account all of the promised benefits to which members are entitled as of June 30, 2021, including pension and survivor benefits, and, as required by the Public School Employees' Retirement Code, 24 Pa. C.S. §8101 et. seq. (Retirement Code), is the basis for the contribution rate for fiscal year 2022/2023. In addition, the contribution rate indicated in the report includes a rate for anticipated employer contributions to the Pennsylvania Employees' Defined Contribution plan (DC Plan) for anticipated Class T-G, Class T-H and Class DC participants on or after July 1, 2022 and prior to July 1, 2023.

As required under Section 8502(j) of the Retirement Code, experience studies are performed once in every five-year period. This valuation was prepared on the basis of the demographic and economic assumptions that were recommended on the basis of an Experience Review covering the period from July 1, 2015 to June 30, 2020 and adopted by the Board of Trustees at its March 5, 2021, June 11, 2021 and August 6, 2021 meetings. The valuation also reflects the recommended changes to the administrative option factors, which were adopted by the Board at its August 6 meeting and implemented July 1, 2022. As mandated by the Retirement Code, these assumptions will remain in effect for valuation purposes until such time as the Board of Trustees adopts revised assumptions and/or administrative option factors. The nature and impact of these changes are more fully described in the Executive Summary of this report and in our report on the Experience Study.

This report addresses the funding requirements of PSERS only. Financial reporting required under applicable standards of the Governmental Accounting Standards Board (GASB) are addressed in separate reports.

### **Assets and Membership Data**

The Retirement System provided the individual data for members used in the valuation. While we did not audit the data, we did perform tests for internal consistency and reasonableness. The amount of assets in the trust fund taken into account in the valuation was based on statements furnished by the Retirement System. The accuracy of the results presented in this report is dependent on the accuracy of the data provided.

### **Funding Adequacy**

The valuation results indicate that the employer contribution rate for fiscal year 2022/2023 is 35.26%, which includes a rate of 0.20% for employer contributions to the DC Plan. This is an estimated average DC contribution rate. The actual employer DC contribution rate applicable to each participating employer will be based on the employer's Class T-G, Class T-H, and Class-DC-only membership.

As of June 30, 2021, the total funded ratio of the plan (for Pensions and Health Insurance Premium Assistance combined) is 59.6%, based on the accrued liability and actuarial value of assets calculated under the funding requirements of Section 8328 of the Retirement Code.

For the seventh consecutive year, the PSERS Board has certified the full employer contribution rate calculated by the actuary. This follows 15 years in which contributions to the System were statutorily constrained to be less than the actuarially determined amounts. Receipt of the full actuarially determined employer contribution is an essential step to bring PSERS back to a fully funded status. Full actuarial funding from employers along with member contributions and investment income are necessary sources of funds for the amortization of the unfunded liability of the Retirement System.

Unless stated otherwise, references to “funded ratio” and “unfunded accrued liability” are measured using the actuarial value of assets. It should be noted that if the same measurements were made using the market value of assets, different funded ratios and unfunded accrued liabilities would result. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the Retirement System if it were to settle (i.e., purchase annuities to cover) a portion or all of its liabilities. Assuming that contributions are made at the level developed in the actuarial valuation and no future experience gains or losses arise, future expected contributions are expected to remain relatively level as a percent of payroll and the Retirement System’s funded status is expected to increase.

### **Financial Results and Membership Data**

Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are shown in the valuation report. The actuaries prepared supporting schedules included in the Actuarial and Statistical Section of the PSERS Annual Comprehensive Financial Report (ACFR) and also provided historical data schedules included in the Financial Section of the ACFR.

### **Use of Models**

Actuarial Standard of Practice No. 56 (ASOP 56) provides guidance to actuaries when performing actuarial services with respect to designing, developing, selecting, modifying, using, reviewing, or evaluating models. Buck uses the following:

- third-party software in the performance of annual actuarial valuations and projections to calculate the liabilities associated with the provisions of the System using data and assumptions as of the measurement date under the funding methods specified in this report.
- an internally developed model that applies applicable funding methods and policies to the liabilities derived from the output of the third-party software and other inputs, such as System assets and contributions, to generate many of the exhibits found in this report

Buck has an extensive review process whereby the results of the liability calculations are checked using detailed sample output, changes from year to year are summarized by source, and significant deviations from expectations are investigated. Other outputs and the internal model are similarly reviewed in detail and at a high level for accuracy, reasonability and consistency with prior results. Buck also reviews the third-party model when significant changes are made to the software or model. The review is performed by experts within the company who are familiar with applicable funding methods as well as the manner in which the model generates its output. If significant changes are made to the internal model, extra checking and review are completed. Significant changes to the internal model that are applicable to multiple clients are generally developed, checked and reviewed by multiple experts within the company who are familiar with the details of the required changes.

Future actuarial measurements may differ significantly from current measurements due to Retirement System experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in Retirement System provisions or applicable law. Liability models necessarily rely on the use of actuarial assumptions, approximations and estimates and are sensitive to changes in these actuarial assumptions, approximations and estimates. Small variations in these actuarial assumptions, approximations and estimates may lead to significant changes in actuarial measurements. An analysis of the potential range of such future differences is beyond the scope of this valuation. However, Actuarial Standard of Practice No. 51 (ASOP 51) applies to funding calculations such as those presented in this report and requires certain disclosures of potential risks. Exhibit VIII contains an assessment of the key risks applicable to the Retirement System.

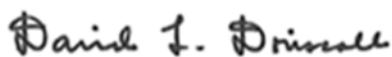
### **Reasonability of Assumptions**

Actuarial Standards of Practice ("ASOPs") 27 and 35 ask the actuary to disclose the information and analysis used to support the actuary's determination that the assumptions selected by the Board do not significantly conflict with what, in the actuary's professional judgment, are reasonable for the purpose of the measurement. The Board adopted a new set of economic and demographic assumptions for the June 30, 2021 actuarial valuation based on the recommendations outlined by Buck in their 5-year experience study for the period July 1, 2015 to June 30, 2020. In the case of the Board's selection of an expected return on assets ("EROA"), the signing actuaries have also reviewed the analysis provided by the System's investment advisor as well as Buck's Financial Risk Management ("FRM") practice and determined the EROA assumption together with the System's other economic and demographic assumptions do not conflict with what, in the actuary's professional judgment, is reasonable for the purpose of the measurement.

Use of this report for any other purpose, or by anyone other than the Board of Trustees or the staff of PSERS or employers or its auditors, may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of the report for that purpose. Buck should be asked to review any statement to be made on the basis of the results contained in this report. Buck will accept no liability for any such statement made without prior review by Buck.

David L. Driscoll is a Fellow of the Society of Actuaries and a Member of the American Academy of Actuaries. Edward Quinn and Salvador Nakar are Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein. This report has been prepared in accordance with all applicable Actuarial Standards of Practice, and we are available to answer questions concerning it.

Buck Global, LLC



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# Pennsylvania Public School Employees' Retirement System

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# Executive Summary

This report presents the actuarial valuation as of June 30, 2021 for the Pennsylvania Public School Employees' Retirement System.

The principal valuation results include:

- The employer contribution rate for fiscal year 2022/2023, which is 35.26% (34.31% Pension plus 0.75% Premium Assistance plus 0.20% Act 5 DC contribution).
  - The 0.20% Act 5 DC contribution rate is an estimated average employer DC contribution rate. The actual DC contribution rate applicable to each employer will be based on the employer's Class T-G, Class T-H, and Class-DC-only membership.
- The unfunded accrued liability as of June 30, 2021 is \$45.5 billion. The increase in the unfunded accrued liability from \$44.0 billion in the June 30, 2020 valuation is attributable to:
  - Actuarial net experience gain of \$814 million in the year ending June 30, 2021
  - Recognition of the Act 5 shared-risk contributions liability increase of \$29 million
  - An increase of \$2.772 billion in the System's unfunded accrued liability due to changes in assumptions.
- The total funded ratio of the Retirement System determined as of June 30, 2021 under the funding requirements of Section 8328 of the Retirement Code is 59.6%, which is based on the accrued liability and the actuarial value of assets for Pensions and Health Insurance Premium Assistance as of that date. The funded ratio as of June 30, 2020 was 59.2%.
- The Act 120 minimum employer pension rate is the normal cost rate of 6.07%.
- For the seventh consecutive year, the PSERS Board has certified the full employer contribution rate calculated by the actuary. This follows 15 years in which contributions to the System were constrained to be less than the actuarially determined amounts. This is an essential step to bring PSERS back to a fully funded status. Full actuarial funding from employers along with member contributions and investment income are necessary sources of funds to pay down the unfunded liability of the System.
- The results of the June 30, 2020 valuation were previously presented to the Budget/Finance Committee of the Board of Trustees at its December 3, 2020 meeting. The Board accepted and certified the results via the Public School Employees' Retirement Board (PSERB) Resolution 2020-52. At the same Board meeting, the Board certified that the Act 5-2017 member shared-risk contributions would not become effective July 1, 2021. In April of 2021, on the basis of revised information provided by the System's investment consultant, the Board certified that the Act 5-2017 member shared-risk contributions would become effective July 1, 2021. The recertification of the Act 5-2017 risk-share came well after June 30, 2020, the measurement date for the valuation, and certification and acceptance of the valuation results but prior to the issuance of the actuarial valuation results. In accordance with section 3.4.2 of the Actuarial Standards of Practice No. 4 (ASOP 4), the occurrence of this post-measurement-date event is disclosed. The member shared risk contributions are first recognized in this June 30, 2021 valuation of the System.

The next Class T-E, Class T-F, Class T-G and Class T-H shared-risk valuation is to be performed for the ten-year period ending June 30, 2023. The Act 5-2017 member shared-risk contribution rates are discussed on page 10.

- Annual disclosures as of June 30, 2021 in accordance with the Governmental Accounting Standards Board (GASB) Statements No. 67 and 68 for Pensions and Statements No. 74 and 75 for the Health Insurance Premium Assistance Program have been provided in separate reports.

The valuation was completed based upon membership and financial data submitted by the Retirement System. Detailed summaries of the financial results of the valuation and membership data used in preparing the valuation are included in the valuation report. The actuaries prepared supporting schedules included in the Actuarial and Statistical Section of the PSERS Annual Comprehensive Financial Report (ACFR) and also provided historical data schedules included in the Financial Section of the ACFR.

## **Changes Since Last Year**

### Legislative and Administrative Changes

The benefit provisions and contribution provisions are summarized in Table 13. There were no legislative or administrative changes since the prior valuation.

### Actuarial Assumptions and Methods

The actuarial assumptions and methods are outlined in Table 12. As required under Section 8502(j) of the Retirement Code, experience studies are performed once in every five-year period. This valuation was prepared using demographic, economic and administrative option factors assumptions that were recommended on the basis of the Experience Review covering the period from July 1, 2015 to June 30, 2020 and adopted by the Board at its March 5, 2021, June 11, 2021 and August 6, 2021 meetings.

### Demographic Assumptions

1. Update the rates of withdrawal, disability, and retirement from employment among active members to reflect recent experience.
2. Update the rates of mortality among active members, annuitants, beneficiaries and survivors to reflect recent experience as follows:
  - a. Active Members:
    - Update the male active member mortality table to a blended table based on 50% PubT-2010 Employee (Total Teacher dataset) and 50% PubG-2010 Employee (Total General Employees dataset) Amount Weighted Male Tables, with a 99.0% adjustment, generationally projected with Buck Modified scale MP-2020
    - Update the female active member mortality table to a blended table based on 50% PubT-2010 Employee (Total Teacher dataset) and 50% PubG-2010 Employee (Total General Employees dataset) Amount Weighted Female Tables, with an 88.6% adjustment, generationally projected with Buck Modified scale MP-2020
  - b. Annuitants and Dependent Beneficiaries:
    - Update the male annuitant mortality table to a blended table based on 50% PubT-2010 Retiree (Total Teacher dataset) and 50% PubG-2010 Retiree (Total General Employees dataset) Amount Weighted Male Tables, with a 99.7% adjustment, generationally projected with Buck Modified scale MP-2020
    - Update the female annuitant mortality table to a blended table based on 50% PubT-2010 Retiree (Total Teacher dataset) and 50% PubG-2010 Retiree (Total General Employees dataset) Amount Weighted Female Tables, with a 99.7% adjustment, generationally projected with Buck Modified scale MP-2020

dataset) Amount Weighted Female Tables, with a 95.4% adjustment, generationally projected with Buck Modified scale MP-2020

- Update the male disabled annuitant mortality table to the Pub-2010 Disability Mortality Non-Safety Amount Weighted Male Table, with a 105.4% adjustment, generationally projected with Buck Modified scale MP-2020
- Update the female disabled annuitant mortality table to the Pub-2010 Disability Mortality Non-Safety Amount Weighted Female Table, with a 95.0% adjustment, generationally projected with Buck Modified scale MP-2020
- Update the male beneficiary and survivor annuitant mortality to the Pub-2010 Contingent Survivor Amount Weighted Male Table, with a 106.0% adjustment, generationally projected with Buck Modified scale MP-2020
- Update the female beneficiary and survivor annuitant mortality to the Pub-2010 Contingent Annuitant Amount Weighted Female Table, with a 116.2% adjustment, generationally projected with Buck Modified scale MP-2020

#### Economic Assumptions

1. Reduce the interest rate from 7.25% per annum to 7.00% per annum
2. Reduce the rate of inflation from 2.75% per annum to 2.50% per annum
3. Reduce the average rate of increase in annual salaries among active members from an average of 5.00% per annum to 4.50% per annum
4. Reduce the annual payroll growth assumption of 3.50% per annum to 3.25% per annum

#### Optional Forms of Benefit Payment at Retirement

1. Update to the following distribution of optional forms of annuity payment elections:
  - Maximum Straight Life Annuity – from 50% to 45%
  - Option 1 – from 20% to 25%
  - Option 2 remains at 20% (assuming males are 3 years older than females)
  - Option 3 remains at 10% (assuming males are 3 years older than females)
  - Option 4 annuity remains at 0%
2. Update the assumption for Option 4 withdrawal of accumulated deductions payments from 80% to:
  - 75% of all eligible Class T-C and Class T-D retirements
  - 50% of all eligible Class T-E, Class T-F, Class T-G and Class T-H retirements
3. Update the withdrawal annuity election rates to 50% of members are assumed to commence payment immediately and 50% are assumed to defer payment to superannuation age



### Administrative Optional Forms of Payment Factors

Update the mortality basis to a 25% male and 75% female blend of the above Board approved base annuitant mortality tables, generationally projected to 2025 with the Buck Modified MP-2020 improvement scale.

### Premium Assistance Election Coverage

Update the Health Care Premium Assistance information required for Governmental Accounting Standards Board Statement Nos. 74 and 75 reporting to be based on the corresponding headcount-weighted mortality tables.

There have been no other changes in the actuarial assumptions and methods from those used in the prior valuation.

We have reviewed the assumptions and methods used in completing the June 30, 2021 actuarial valuation and believe that they are reasonable and in compliance with the applicable standards.

### **Contribution Rates**

The results of the valuation as of June 30, 2021 determine the employer contribution rate for fiscal year 2022/2023. The calculated employer contribution rate for the 2022/2023 fiscal year is 35.26% and the Board of Trustees certified this rate at its December 17, 2021 meeting. The 35.26% Employer rate includes a rate of 0.20% for employer DC contributions. This is an average estimated rate based on the assumptions outlined in Table 12 for future Class T-G, Class T-H and Class DC only membership. Actual employer DC contributions will be based on each employer's actual Class T-G, Class T-H and Class DC only membership.

The average base contribution rate payable by the members is 7.52%. The average base member contribution rate of 7.52% is a pay-weighted average of member rates that vary based on date of hire and Class membership. Effective January 1, 2002, the employee base contribution rate for members who elected to have prior school service and intervening military service converted to Class T-D service increased by 1.25% to 7.50%. Anyone who enrolled after July 1, 2001 and before July 1, 2011 is a member of Class T-D. Any employee who becomes a member after June 30, 2011 and prior to July 1, 2019 is a Class T-E member or, alternatively, may elect to become a Class T-F member. The base contribution rate for Class T-E members is 7.50% of compensation. The base contribution rate for Class T-F members is 10.30% of compensation. Any employee who becomes a member after June 30, 2019 is a Class T-G member or, alternatively may elect to become a Class T-H member or a DC only participant. The base contribution rate for Class T-G members is 5.5% for the defined benefit plan and 2.75% for the defined contribution plan and for Class T-H members is 4.5% for the defined benefit plan and 3.0% for the defined contribution plan. DC only participants contribute 7.50% to the defined contribution plan.

In accordance with the Act 5-2017 Class T-E, Class T-F, Class T-G and Class T-H shared-risk contribution provision, the contribution rates for Class T-E, Class T-F, Class T-G and Class T-H members will increase by 0.50%, 0.50%, 0.75% and 0.75%, respectively, effective July 1, 2021. The Act 5-2017 shared-risk provisions are discussed on page 10.

## Reasons for Change in the Employer Rate Calculated by the Actuary

The employer contribution rate calculated by the actuary increased from 34.94% for fiscal year 2021/2022 to 35.26% for fiscal year 2022/2023. The reconciliation of the employer contribution rates by source is as follows:

• FY 2022/2023 employer contribution rate	34.94%
• Decrease due to change in normal rate	(0.18)
• Net increase due to total employer payroll growth and liability experience <sup>1</sup>	0.12
• Decrease due to actuarial gain on assets	(0.01)
• Increase due to assumption changes	0.39
• Increase in Act 5 DC employer contribution rate	0.05
• Change in health insurance premium assistance contribution rate	<u>(0.05)</u>
• FY 2022/2023 employer contribution rate	35.26%

1. Reflects increase in total employer payroll and liability gains.

## Summary of Principal Results

Summarized below are the principal financial results for the Public School Employees' Retirement System based upon the actuarial valuation as of June 30, 2021. Comparable results from the June 30, 2020 valuation are also shown.

Item	June 30, 2021	June 30, 2020
<b>Demographics</b>		
Active Members		
• Number <sup>1</sup>	248,091	256,246
• Average Annual Pay	\$ 56,663	\$ 54,535
Annuitants		
• Number <sup>2</sup>	242,839	239,614
• Average Annual Benefit Payment	\$ 25,992	\$ 25,753
<b>Contribution Rates (as a Percentage of Payroll)</b>		
	(Fiscal Year 2022/2023)	(Fiscal Year 2021/2022)
Employer Contribution Rate:		
• Total Pension Rate Calculated by Actuary <sup>3</sup>	34.31%	33.99%
• Health Insurance Premium Assistance Contribution Rate	0.75	0.80
• Act 5 DC Employer Contribution Rate <sup>4</sup>	<u>0.20</u>	<u>0.15</u>
• Total Contribution Rate	35.26%	34.94%
• Total Contribution Rate Certified by Board	35.26%	34.94%
• Member Average Base Contribution Rate	<u>7.52</u>	<u>7.56</u>
• Total Rate	42.78%	42.50%
<b>Funded Status<sup>5</sup></b>		
• Accrued Liability	\$ 112,783.3 Mil	\$ 107,963.8 Mil
• Actuarial Value of Assets	67,248.7	63,929.4
• Market Value of Assets	72,099.9	58,687.2
• Unfunded Accrued Liability		
• Actuarial Value of Assets	\$ 45,534.6	\$ 44,034.4
• Market Value of Assets	40,683.4	49,276.6
• Funded Ratio		
• Actuarial Value of Assets	59.6%	59.2%
• Market Value of Assets	63.9%	54.4%

1. Excludes 54 and 60 DC-only participants as of June 30, 2021 and June 30, 2020, respectively.
2. Excludes 1,678 and 1,281 beneficiaries as of June 30, 2021 and June 30, 2020, respectively, who are only entitled to a pending lump sum distribution
3. The Act 120 minimum pension rate for the June 30, 2021 valuation is 6.07% and for the June 30, 2020 valuation is 7.20%.
4. Average DC contribution rate. Actual rate will vary by employer based on Class T-G, Class T-H, and Class DC only memberships.
5. Pensions and Health Insurance Premium Assistance combined.

## Five-Year History of Principal Financial Results

### Five-Year History of Contribution Rates

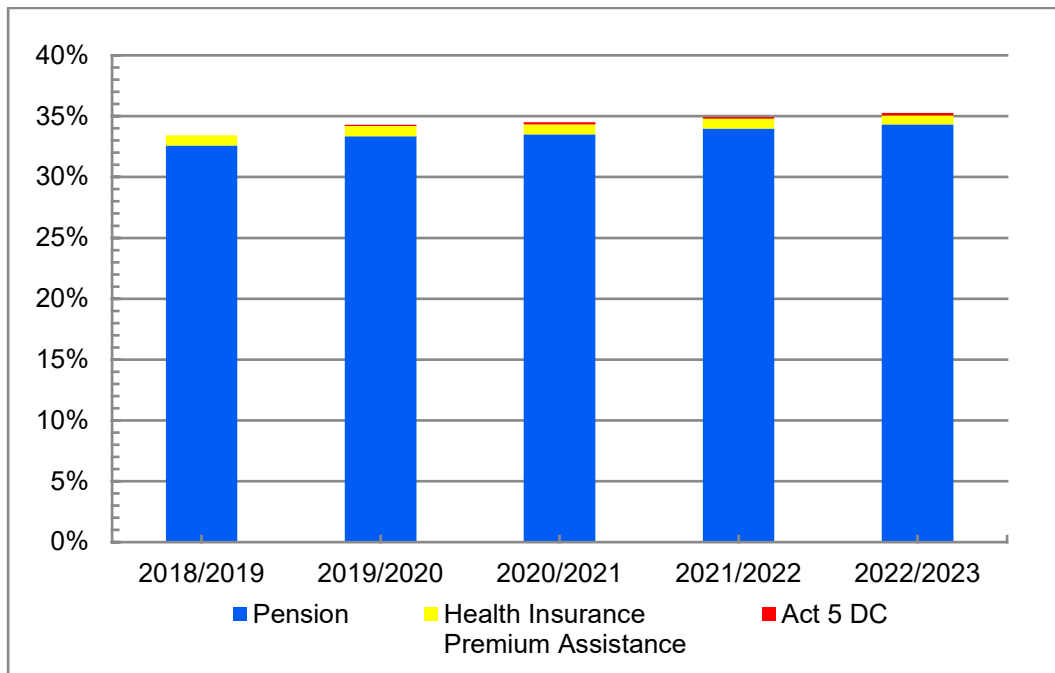
(As a % of Payroll)

Fiscal Year	Member Contributions	Employer Contributions					
		Normal Cost	Unfunded Accrued Liability	Health Insurance Premium Assistance	Act 5 DC Employer Rate <sup>1</sup>	Preliminary Employer Contribution	Final Employer Contribution <sup>2</sup>
2022/2023	7.52%	6.07%	28.24%	0.75%	0.20%	35.26%	35.26%
2021/2022	7.56	7.20	26.79	0.80	0.15	34.94	34.94
2020/2021	7.61	7.37	26.14	0.82	0.18	34.51	34.51
2019/2020	7.59	7.49	25.87	0.84	0.09	34.29	34.29
2018/2019	7.57	7.59	25.01	0.83	N/A	33.43	33.43

1. Average DC contribution rate. Actual rate will vary by employer based on Class T-G, Class T-H and Class DC only membership.
2. Certified by the Board.

The following chart shows a five-year history of employer contribution rates:

**Five-Year History of Employer Contribution Rates**



## Funded Ratio

The financing objective of the Retirement System is to:

- Fully fund all current costs based on the normal contribution rate determined under the funding method; and
- Liquidate the unfunded accrued liability based on level-percent-of-pay amortization schedules required by the Retirement Code as amended by Act 120-2010, i.e., a schedule of 24 years for the unfunded accrued liability as of June 30, 2010 and each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any legislation after June 30, 2010 that increases the liability due to benefit enhancements will be funded over 10 years based on level-percent-of-pay amortization.
- As directed by Act 120-2010, the minimum employer pension contribution rate will be the normal cost rate.
- Fully fund the employer contribution to the Defined Contribution Plan.

The total contribution rate of 35.26% of payroll payable by employers, when taken together with the contributions payable by the members, current assets, and expected future asset returns, is sufficient to achieve the financing objective.

The Retirement System's total funded ratio on this funding basis is measured by comparing the actuarial value of assets (based on a 10-year moving average market value) to the accrued liability. The accrued liability for pensions is the present value of benefits accumulated to date under the Retirement System's funding method and reflects future pay increases for active employees. The accrued liability for Health Insurance Premium Assistance equals the assets in the Health Insurance account.

On this basis, the Retirement System's total funded ratio (for Pensions and Health Insurance Premium Assistance combined) is 59.6% as of June 30, 2021. This funded ratio is based on an actuarial value of assets of \$67.25 billion and an accrued liability of \$112.78 billion. The funded ratio for Pensions alone is 59.6% as of June 30, 2021, based on an actuarial value of assets of \$67.12 billion and an accrued liability of \$112.65 billion.

### Reasons for Change in the Total Funded Ratio

The total funded ratio increased from 59.2% as of June 30, 2020 to 59.6% as of June 30, 2021. Employers have been contributing the full actuarially determined contributions since the fiscal year ending June 30, 2017, as shown on page 20. The increase is due to returns better than expected on assets measured at actuarial value and a net actuarial gain due to demographic experience which were offset by increases in the liability due to changes to the demographic and economic assumptions used to value the System's liability.

Table 6 provides an analysis of the change in the unfunded accrued liability as of June 30, 2021.

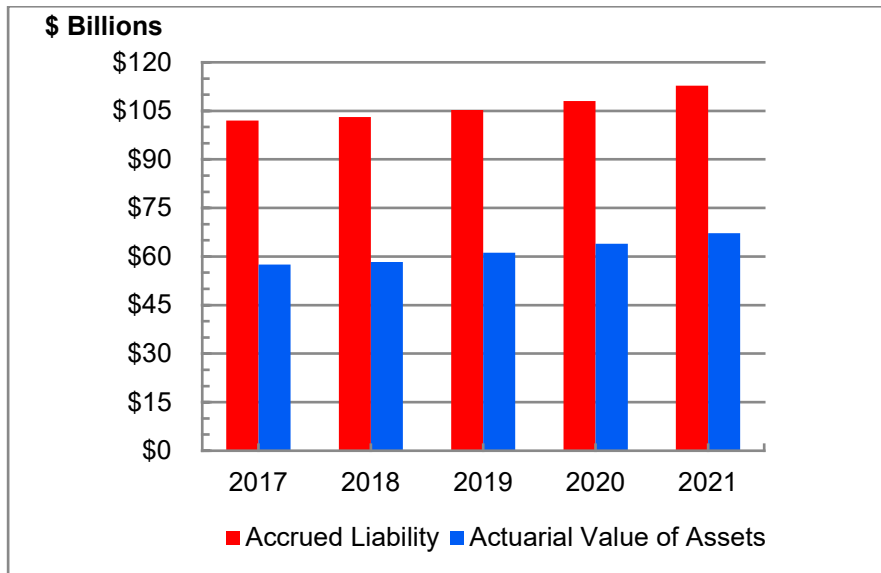
**Five-Year History of Total Funded Ratio<sup>1</sup>**  
 (\$ Amounts in Millions)

<b>Valuation as of June 30</b>	<b>Accrued Liability</b>	<b>Actuarial Value of Assets</b>	<b>Unfunded Accrued Liability</b>	<b>Funded Ratio</b>
2021	\$ 112,783.3	\$ 67,248.7	\$ 45,534.6	59.6%
2020	107,963.8	63,929.4	44,034.4	59.2
2019	105,324.7	61,190.5	44,134.2	58.1
2018	103,113.6	58,258.3	44,855.3	56.5
2017	101,972.6	57,460.6	44,512.0	56.3

1. For Pensions and Health Insurance Premium Assistance (under the funding provisions of the Retirement Code).

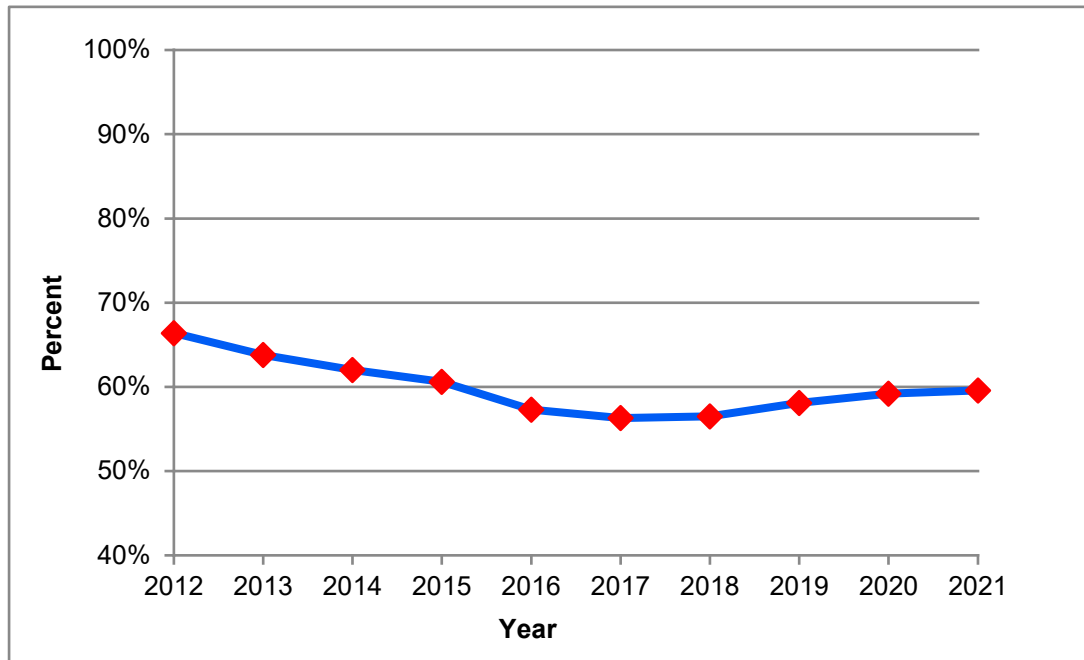
The following chart shows a five-year history of the accrued liability and the actuarial value of assets:

**Five-Year History of Accrued Liability and Actuarial Value of Assets**



The following chart shows a ten-year history of the total funded ratio based on actuarial value of assets for Pensions and Health Insurance Premium Assistance:

**Ten-Year History of Total Funded Ratio (2012 – 2021)**



**Act 5-2017 Class T-E, Class T-F, Class T-G and Class T-H shared-risk contributions**

Commencing with the annual actuarial valuation for the period ending June 30, 2014, and every three years thereafter, the Board compares the actual investment rate of return, net of fees, to the annual interest rate adopted by the Board for the calculation of the normal contribution rate, based on the market value of assets, for the prior ten-year period. Until the Retirement System has accumulated a ten-year period of investment rate of return experience following June 30, 2011, the look-back period used in this calculation will begin not earlier than June 30, 2011.

The shared-risk contribution rates of Class T-E, Class T-F, Class T-G, and Class T-H members are determined as follows:

- If the actual time-weighted investment rate of return, net of fees, is less than the annual interest rate adopted by the Board by an amount of 1% or more, the shared-risk contribution rate of Class T-E and Class T-F members will increase by 0.5% and the shared-risk contribution rate for Class T-G and Class T-H members will increase by .75%.

If the actual time-weighted investment rate of return, net of fees, is equal to or exceeds the annual interest rate adopted by the Board by less than 1%, the shared-risk contribution rate of Class T-E and Class T-F members will decrease by 0.5% and the shared-risk contribution rate for Class T-G and Class T-H members will decrease by .75% provided the total member contribution rate on the date of the actuarial valuation is above the member's basic contribution rate.

- If the actual time-weighted investment rate of return, net of fees, is more than the annual interest rate adopted by the Board by an amount of 1% or more, the shared-risk contribution rate of

Class T-E and Class T-F members will decrease by 0.5% and the shared-risk contribution rate for Class T-G and Class T-H members will decrease by .75%.

If the actual time-weighted investment rate of return, net of fees, is equal to or below the annual interest rate adopted by the Board by less than 1%, the shared-risk contribution rate of Class T-E and Class T-F members will increase by 0.5% and the shared-risk contribution rate for Class T-G and Class T-H members will increase by .75% provided the total member contribution rate on the date of the actuarial valuation is below the member's basic contribution rate.

The total member contribution rate for Class T-E members shall not be less than 5.5%, nor more than 9.5%. The total member contribution rate for Class T-F members shall not be less than 8.3%, nor more than 12.3%. The total member pension contribution rate for Class T-G members shall not be less than 2.5% nor more than 8.5% and the total member pension contribution rate for Class T-H members shall not be less than 1.5% nor more than 7.5%.

If the Retirement System's total funded ratio based on the actuarial value of assets is at least 100% as of the measurement date, the shared risk contribution rate shall not be greater than zero. If the annual interest rate adopted by the Board for the calculation of the normal contribution rate is changed during the period used to determine the shared-risk contribution rate, the Board, with the advice of the actuary, shall determine the applicable rate during the entire period, expressed as an annual rate. For any fiscal year in which the employer contribution rate is lower than the final contribution rate under section 8328(h), the total member contribution rate for Class T-E, T-F, T-G and T-H members shall be prospectively reset to the basic contribution rate provided the total member contribution rate is at or above the basic contribution rate. There shall be no increase in the member contribution rate if there has not been an equivalent increase to the employer contribution rate over the previous three-year period.

In accordance with Section 8328 of the Retirement Code, member shared-risk contributions cannot be used to offset the employer normal contribution rate. Instead, any increase or decrease in the unfunded accrued liability due to member shared-risk contributions shall be recognized as part of the System's actuarial experience and amortized as a level percentage of compensation over a period of 24 years beginning with the July 1 second succeeding the actuarial valuation in which the shared-risk contribution was recognized.

The next Class T-E, Class T-F, Class T-G and Class T-H "shared-risk" valuation is to be performed for the ten-year period ending June 30, 2023.



## Rate of Return

The investment return of the trust fund (i.e., total return including both realized and unrealized gains and losses) for fiscal years 2011/2012 through 2020/2021 is shown in the table below.

The rate of return on market value reflects the investment earnings on the market value of assets from the beginning of the fiscal year to the end of the fiscal year.

<b>Fiscal Year</b>	<b>Rate of Return Based on Market Value<sup>1</sup></b>
2020/2021	24.6%
2019/2020	1.1
2018/2019	6.7
2017/2018	9.3
2016/2017	10.2
2015/2016	1.3
2014/2015	3.1
2013/2014	14.8
2012/2013	8.0
2011/2012	3.4

1. Provided by PSERS' investment consultants (Aon for fiscal years 2013/2014 - 2020/2021 and Wilshire Associates for prior years).

**Table 1**

**Summary of Results of Actuarial Valuation as of June 30, 2021**  
(\$ Amounts in Thousands)

Item	June 30, 2021	June 30, 2020
<b>Member Data</b>		
1. Number of Members		
a) Active Members <sup>1</sup>	248,091	256,246
b) Vesteers <sup>2</sup>	26,892	25,903
c) Annuitants, Beneficiaries and Survivor Annuitants <sup>3</sup>	242,839	239,614
d) Total	<u>517,822</u>	<u>521,763</u>
2. Annualized Salaries (\$ Amounts in Thousands) <sup>4</sup>	\$ 14,057,526	\$ 13,974,295
3. Annual Annuities (\$ Amounts in Thousands)	\$ 6,311,757	\$ 6,170,896
<b>Valuation Results</b>		
4. Present Value of Future Pension Benefits		
a) Active Members	\$ 65,522,561	\$ 66,004,231
b) Inactive Members and Vesteers	2,827,728	2,444,758
c) Annuitants, Beneficiaries and Survivor Annuitants	61,168,172	58,415,383
d) Total	<u>\$ 129,518,461</u>	<u>\$ 126,864,372</u>
5. Present Value of Future Pension Normal Cost		
a) Active Members	\$ 9,697,482	\$ 10,044,827
b) Employer	7,170,154	8,986,146
c) Total	<u>\$ 16,867,636</u>	<u>\$ 19,030,973</u>
6. Pension Accrued Liability		
a) Active Members (4a) - (5c)	\$ 48,654,925	\$ 46,973,258
b) Inactive Members and Vesteers	2,827,728	2,444,758
c) Annuitants, Beneficiaries and Survivor Annuitants	61,168,172	58,415,383
d) Total	<u>\$ 112,650,825</u>	<u>\$ 107,833,399</u>
7. Health Insurance Assets for Premium Assistance	\$ 132,515	\$ 130,417
8. Total Accrued Liability for Funding (6) + (7)	\$ 112,783,340	\$ 107,963,816
9. Actuarial Value of Assets	\$ 67,248,672	\$ 63,929,354
10. Funded Status (9) / (8)	59.6 %	59.2 %
11. Unfunded Accrued Liability (8) - (9)	\$ 45,534,668	\$ 44,034,462
12. Total Normal Cost Rate	13.59 %	14.76 %
13. Member Contribution Rate	7.52 %	7.56 %
14. Employer Normal Cost Rate (12) - (13)	6.07 %	7.20 %
<b>Employer Annual Funding Requirement</b>		
15. Employer Contribution Rate Calculated by Actuary	<b>Fiscal 2022/2023</b>	<b>Fiscal 2021/2022</b>
a) Normal Cost	6.07 %	7.20 %
b) Unfunded Accrued Liability	<u>28.24</u>	<u>26.79</u>
c) Preliminary Pension Rate	34.31 %	33.99 %
d) Health Insurance Premium Assistance	0.75	0.80
e) Act 5 DC <sup>5</sup>	<u>0.20</u>	<u>0.15</u>
f) Total Rate <sup>6</sup> = (15c) + (15d) + (15e)	35.26 %	34.94 %

1. Excludes 54 and 60 DC-only participants as of June 30, 2021 and June 30, 2020, respectively.

2. Excludes 140,771 and 135,613 inactive members and non-members as of June 30, 2021 and June 30, 2020, respectively, who are no longer participating and are valued for their accumulated deductions only.

3. Excludes 1,678 and 1,281 beneficiaries as of June 30, 2021 and June 30, 2020, respectively, who are only entitled to a pending lump sum distribution.

4. The salaries shown represent an annual rate of pay for members who were in active service on the valuation date.

5. Average DC contribution rate. Actual rate will vary by employer based on Class T-G, Class T-H, and Class DC-only memberships.

6. The Act 120 minimum pension rate for the June 30, 2021 valuation is 6.07% and for the June 30, 2020 valuation is 7.20%.

**Table 2**

**Summary of Sources of Employer Contribution Rate as of June 30, 2021**  
 (\$ Amounts in Thousands)

	Funding Period (Years)	Beginning July 1	Initial Liability	6/30/2021 Outstanding Balance	Annual Payment	
					Amount	Percent <sup>1</sup>
1. Amortization of:						
a) Act 120 Fresh Start Unfunded Accrued Liability and Asset Method Change	24	2011	\$ 16,279,283	\$ 17,180,190	\$ 1,696,040	11.70 %
b) 2010 Experience	24	2011	3,419,297	3,594,672	354,868	2.45 %
c) 2011 Experience	24	2012	564,642	598,381	56,041	0.39 %
d) 2011 Assumption Changes	24	2012	4,592,397	4,866,813	455,797	3.14 %
e) 2012 Experience	24	2013	2,372,550	2,547,421	227,319	1.57 %
f) 2013 Experience	24	2014	2,707,494	2,934,162	250,427	1.73 %
g) 2014 Experience	24	2015	2,170,432	2,366,135	193,803	1.34 %
h) 2015 Experience	24	2016	1,941,277	2,122,589	167,342	1.15 %
i) 2016 Experience	24	2017	2,666,236	2,909,354	221,369	1.53 %
j) 2016 Assumption Changes	24	2017	2,521,326	2,751,230	209,337	1.44 %
k) 2017 Experience	24	2018	1,433,915	1,562,693	115,031	0.79 %
l) 2017 Act 5	24	2018	(6,867)	(7,483)	(551)	0.00 %
m) 2018 Experience	24	2019	348,881	378,911	27,042	0.19 %
n) 2019 Experience	24	2020	(527,527)	(569,853)	(39,508)	(0.27)%
o) 2020 Experience	24	2021	291,214	312,327	21,073	0.14 %
p) 2021 Experience	24	2022	(785,001)	(785,001)	(54,757)	(0.38)%
q) 2021 Assumption Changes	24	2022	2,772,127	<u>2,772,127</u>	<u>193,368</u>	<u>1.33 %</u>
Total				\$ 45,534,668	\$ 4,094,041	28.24 %
2. Employer Normal Cost Rate						<u>6.07 %</u>
3. Pension Rate (1) + (2) <sup>2</sup>						34.31 %
4. Health Insurance Premium Assistance Rate						0.75 %
5. Act 5 DC Rate <sup>3</sup>						<u>0.20 %</u>
6. Final Total Employer Contribution Rate Calculated by Actuary: (3) + (4) + (5)						35.26 %

1. Based on Estimated Employer Payroll for Fiscal Year Ending 2023 of \$14,497,000.

2. Cannot be less than the Act 120 Fiscal Year 2023 Minimum Employer Pension Rate (Employer Normal Cost Rate) of 6.07%.

3. Average DC contribution rate. Actual rate will vary by employer based on Class T-G, Class T-H, and Class DC-only memberships.

**Table 3**

**Determination of Health Insurance Premium Assistance Contribution Rate for Fiscal Year  
2022/2023**

(\$ Amounts in Thousands)

<b>Item</b>			
1. June 30, 2021 Balance in Health Insurance Premium Assistance Account			\$ 132,515
2. Estimated Fiscal 2021/2022 Contribution			
(a) Contribution Rate Certified in 2020 Valuation			0.80%
(b) Estimated Fiscal 2021/2022 payroll			\$ 14,424,179
(c) Estimated Contribution = (a) x (b)			\$ 115,393
3. Estimated Number of Annuitants who:	Are Eligible	Elect Percent	Elect Coverage
(a) Fiscal 2021/2022	154,900	63.00%	97,587
(b) Fiscal 2022/2023	156,400	62.00%	96,968
(c) Fiscal 2023/2024	158,000	62.00%	97,960
4. Estimated Disbursements:	Administration	Assistance	Total
(a) Fiscal 2021/2022	\$ 1,344	\$ 117,104	\$ 118,448
(b) Fiscal 2022/2023	1,415	116,362	117,777
(c) Fiscal 2023/2024	1,486	117,552	119,038
(d) Total	\$ 4,245	\$ 351,018	\$ 355,263
5. Required Fiscal 2022/2023 Contribution			\$ 107,355
(4d) - (1) - (2c)			
6. Required Health Insurance Premium Assistance Contribution Rate			
(a) Estimated 2022/2023 Payroll			\$ 14,497,000
(b) Required Health Insurance Premium Assistance Contribution Rate (5) / (6a) (rounded up)			0.75%

**Notes:**

- Current estimates of fiscal 2021/2022 membership payroll and administrative expenses, and of fiscal 2022/2023 administrative expenses, were provided by PSERS staff.
- Beginning in fiscal year 2022/2023, 62% of eligible annuitants are assumed to elect coverage. For fiscal year 2021/2022, the assumption remains at 63%.
- Premium Assistance payments equal \$100 per month per eligible annuitant.

**Table 4**

**Summary of Market Value of Plan Assets as of June 30, 2021**  
(\$ Amounts in Thousands)

<b>Market Value</b>	
1. Market Value of Assets as of June 30, 2020	\$ 58,687,203
2. Contributions During Fiscal 2020/2021	5,956,409
3. Disbursements During Fiscal 2020/2021	7,247,870
4. Investment Return During Fiscal 2020/2021	
a) Investment Return (Net of Investment Expenses)	\$ 14,754,884
b) Administrative Expenses	<u>50,759</u>
c) Investment Return After Expenses (a) - (b)	\$ 14,704,125
5. Market Value of Assets as of June 30, 2021 (1) + (2) - (3) + (4c)	\$ 72,099,867
6. Rate of Return (per Aon)	24.58 %
<b>Asset Allocation by Account</b>	
1. Members' Savings Account	\$ 18,156,350
2. Annuity Reserve Account	61,168,172
3. State Accumulation Account	(7,357,170)
4. Health Insurance Account	<u>132,515</u>
5. Total (1) + (2) + (3) + (4)	\$ 72,099,867

**Table 5**

**Derivation of Actuarial Value of Assets as of June 30, 2021**  
 (\$ Amounts in Thousands)

1. Market Value of Assets as of June 30, 2021							\$ 72,099,867
2. Determination of Deferred Gain (Loss)							
		Return on Assets					
Fiscal					Recognized		Deferred
<u>Year</u>	<u>Actual</u>	<u>Expected</u>	<u>Difference</u>		<u>Amount</u>	<u>% Deferred</u>	<u>Amount</u>
2020/2021	\$ 14,704,125	\$ 4,588,063	\$ 10,116,062		\$ 1,011,606	90.00%	\$ 9,104,456
2019/2020	955,651	4,395,438	(3,439,787)		(343,979)	80.00%	(2,751,830)
2018/2019	3,580,178	4,179,951	(599,773)		(59,977)	70.00%	(419,841)
2017/2018	4,666,466	4,115,904	550,562		55,056	60.00%	330,337
2016/2017	4,948,659	4,101,830	846,829		84,683	50.00%	423,414
2015/2016	426,974	4,220,500	(3,793,526)		(379,353)	40.00%	(1,517,410)
2014/2015	1,284,258	4,202,212	(2,917,954)		(291,795)	30.00%	(875,386)
2013/2014	7,057,089	4,193,490	2,863,599		286,360	20.00%	572,720
2012/2013	4,086,520	4,239,172	(152,652)		(15,265)	10.00%	(15,265)
2011/2012	1,057,435	4,303,637	(3,246,202)		(324,620)	0.00%	0
			\$ 227,158		\$ 22,716		\$ 4,851,195
3. Preliminary Actuarial Value of Assets <sup>1,2</sup> (1) - (2)							\$ 67,248,672
4. 70% of the Market Value of Assets (1) x 70%							\$ 50,469,907
5. 130% of the Market Value of Assets (1) x 130%							\$ 93,729,827
6. Actuarial Value of Assets: (3) not less than (4) and not greater than (5)							\$ 67,248,672

1. The amounts reported include assets for both Pension and Health Insurance Premium Assistance.
2. The rate of return on the actuarial value of assets was 7.29%. This investment return is based on the change in the actuarial value of assets from the June 30, 2020 valuation to the June 30, 2021 valuation. The actuarial value of assets developed above is a rolling ten-year average. The impact of investment gains and losses is not fully realized in the year the gain or loss arose but is smoothed in over a ten-year period.

**Table 6**

**Analysis of Change in Unfunded Accrued as of June 30, 2021<sup>1</sup>**  
 (\$ Amounts in Thousands)

Item	Amount
1. Unfunded Accrued Liability at June 30, 2020	\$ 44,034,462
2. Interest Credit to June 30, 2021	3,192,498
3. Expected Contributions Toward Unfunded Accrued Liability	<u>3,679,418</u>
4. Expected Unfunded Accrued Liability at June 30, 2021 (1) + (2) - (3)	\$ 43,547,542
5. Actual Unfunded Accrued Liability at June 30, 2021	<u>45,534,668</u>
6. Increase (Decrease) from Expected (5) - (4)	\$ 1,987,126
7. Reasons for Increase (Decrease)	
(a) Experience Losses (Gains)	
(i) Gain from Investment Return on Actuarial Value of Assets	\$ (22,716)
(ii) Loss from New Entrants and Pickups	60,741
(iii) Gain from Salary Increases Less than Expected	(591,148)
(iv) Gain from Mortality Experience	(223,558)
(v) Loss from Terminations (retirement/disability/terminations) Experience	307,638
(vi) Gain from Data/Miscellaneous	<u>(344,468)</u>
(vii) Subtotal - Experience Losses (Gains)	\$ (813,511)
(b) Act 5 Shared-Risk	28,510
(c) Change due to new assumptions adopted by the Board	<u>2,772,127</u>
(d) Total	\$ 1,987,126

1. The amounts reported include assets and liabilities for Pensions only.

**Table 7**

**Schedule of Funding Progress for Pensions<sup>1</sup>**  
(\$ Amounts in Thousands)

Valuation as of June 30	Actuarial Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	Funded Ratio	Covered Payroll <sup>2</sup>	Unfunded Accrued Liability as a Percentage of Covered Payroll
2021	\$ 67,116,157	\$ 112,650,825	\$ 45,534,668	59.6 %	\$ 14,057,526	323.9 %
2020	63,798,937	107,833,399	44,034,462	59.2	13,974,295	315.1
2019	61,065,304	105,199,505	44,134,201	58.0	13,671,927	322.8
2018	58,135,539	102,990,908	44,855,369	56.4	13,379,041	335.3
2017	57,336,856	101,848,817	44,511,961	56.3	13,033,919	341.5
2016	57,265,506	99,989,401	42,723,895	57.3	12,851,289	332.4

1. The amounts reported above include assets and liabilities for Pensions.
2. The salaries shown represent an annual rate of pay for the year ended June 30<sup>th</sup> for members who were in active service on June 30<sup>th</sup>.

The above schedule is not required by current GASB standards for pension plans. The information is provided for historical perspective as PSERS has transitioned to GASB Statement No. 67.

**Table 8**

**Solvency Test for Pensions**  
**Comparative Summary of Accrued Liability and Actuarial Value of Assets**  
(\$ Amounts in Thousands)

Valuation as of June 30	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Member Employer Financed	Actuarial Value of Assets	Portion of Accrued Liability Covered by Valuation Assets		
					(1)	(2)	(3)
2021	\$ 18,156,350	\$ 61,168,172	\$ 33,326,303	\$ 67,116,157	100%	80%	0%
2020	17,558,412	58,415,383	31,859,604	63,798,937	100	79	0
2019	16,839,956	57,413,088	30,946,461	61,065,304	100	77	0
2018	16,120,538	56,742,925	30,127,445	58,135,539	100	74	0
2017	15,500,215	56,184,146	30,164,456	57,336,856	100	74	0
2016	14,907,731	55,314,858	29,766,812	57,265,506	100	77	0



**Table 9**

**Schedule of Employer Contributions For Pensions**  
(\$ Amounts in Thousands)

Fiscal Year Ended June 30	Actuarially Determined Contribution	Actual Contributions Related to the Actuarially Determined Contribution	Contribution Deficiency (Excess)	Percentage Contributed
2021	\$ 4,752,338	\$ 4,752,338	\$ 0	100.0%
2020	4,671,931	4,671,931	0	100.0%
2019	4,478,236	4,478,236	0	100.0%
2018	4,243,328	4,243,328	0	100.0%
2017	3,824,908	3,824,908	0	100.0%

Valuation date: Actuarially determined contributions are calculated as of the June 30 preceding the fiscal year in which contributions are made. That is, the contribution calculated as of the June 30, 2021 actuarial valuation will be made during the fiscal year ended June 30, 2023

**Schedule of Employer Contributions For Postemployment Benefits Other Than Pensions**  
(\$ Amounts in Thousands)

Fiscal Year Ended June 30	Actuarially Determined Contribution	Actual Contributions Related to the Actuarially Determined Contribution	Contribution Deficiency (Excess)	Percentage Contributed
2021	\$ 133,971	\$ 116,365	\$ 17,606	86.9%
2020	138,776	117,723	21,053	84.8%
2019	139,484	114,571	24,913	82.1%
2018	134,607	111,724	22,883	83.0%
2017	125,694	110,985	14,709	88.3%

Valuation date: Actuarially determined contributions are calculated as of the June 30 preceding the fiscal year in which contributions are made. That is, the contribution calculated as of the June 30, 2021 actuarial valuation will be made during the fiscal year ended June 30, 2023

The Actuarially Determined Contribution is based on the Entry Age Normal Accrued Liability and assets as of the valuation date and a 30-year amortization of the unfunded accrued liability. See the Information Required Under Governmental Accounting Standards Board Statement No. 74 as of June 30, 2021 (published September 9, 2021) for additional information.

Table 10

History of Contribution Rates and Funded Ratios

Fiscal Year Ending June	Budgeted Total Employer Payroll (thousands)	Contribution Rates <sup>1</sup>								Funded Ratio
		Employee	Employer Normal Cost	Employer Unfunded Liability	Preliminary Employer Pension	Final Employer Pension <sup>2</sup>	Act 5 Employer DC <sup>7</sup>	Employer Health Insurance	Total Employer	
2012 <sup>3</sup>	\$ 14,112,000	7.37 %	8.12 %	10.15 %	18.27 %	8.00 %		0.65 %	8.65 %	66.4 %
2013 <sup>4</sup>	14,297,000	7.40	8.66	12.99	21.65	11.50		0.86	12.36	63.8
2014	13,720,000	7.43	8.57	15.25	23.82	16.00		0.93	16.93	62.0
2015	13,482,000	7.46	8.46	17.51	25.97	20.50		0.90	21.40	60.6
2016	13,375,000	7.49	8.38	19.44	27.82	25.00		0.84	25.84	57.3
2017	13,549,000	7.52	8.31	20.89	29.20	29.20		0.83	30.03	56.3
2018 <sup>5</sup>	13,449,000	7.54	7.70	24.04	31.74	31.74		0.83	32.57	56.5
2019	13,775,000	7.57	7.59	25.01	32.60	32.60		0.83	33.43	58.1
2020	13,880,000	7.59	7.49	25.87	33.36	33.36	0.09 %	0.84	34.29	59.2
2021	14,078,000	7.61	7.37	26.14	33.51	33.51	0.18	0.82	34.51	<b>59.6</b>
2022	14,289,000	7.56	7.20	26.79	33.99	33.99	0.15	0.80	34.94	
<b>2023<sup>6</sup></b>	<b>14,497,000</b>	<b>7.52</b>	<b>6.07</b>	<b>28.24</b>	<b>34.31</b>	<b>34.31</b>	<b>0.20</b>	<b>0.75</b>	<b>35.26</b>	

1. In general, the Preliminary Employer Pension Rate equals the sum of the rates for the Employer Normal Cost and the Unfunded Liability; and the Final Employer Pension Rate is the greater of the Preliminary Pension Rate and any Pension Rate Floor or Collar stated in the Retirement Code. The Total Employer Rate is the sum of the Final Employer Pension Rate, Act 5 Employer DC Rate and the Employer Health Insurance Premium Assistance Rate.

2. The Final Employer Pension rate is limited by the Act 2010-120 pension rate collars for fiscal years 2012 through 2016.

3. At its January 2009 meeting, the Board voted to reduce the interest rate from 8.50% to 8.25% for the June 30, 2008 valuation and to 8.00% for subsequent valuations.

4. Revised actuarial assumptions based on a five-year experience review ended June 30, 2010 were used to determine the contributions for the fiscal year ending June 30, 2013 and thereafter, which include an interest rate of 7.50%.

5. Revised actuarial assumptions based on a five-year experience review ended June 30, 2015 were used to determine the contributions for the fiscal year ending June 30, 2018 and thereafter, which include an interest rate of 7.25%.

6. Revised actuarial assumptions based on a five-year experience review ended June 30, 2020 were used to determine the contributions for the fiscal year ending June 30, 2023 and thereafter, which include an interest rate of 7.00%.

7. Act 5 new member assumptions for new members after June 30, 2020:

Valuation	Class T-G	Class T-H	DC Only
Before 2020	65%	30%	5%
After 2019	98%	1%	1%

The above rate is an average DC contribution rate. Actual rate will vary by employer based on Class T-G, Class T-H, and Class DC only memberships.

**Table 11**

**History of Annuitants, Beneficiaries, Survivor Annuitants and Active Members**

Valuation as of June 30	Annuitants at End of Year	Beneficiaries and Survivor Annuitants at End of Year	Total Annuitants, Beneficiaries and Survivor Annuitants	Active Members
2012	190,560	11,455	202,015	273,504
2013	197,735	11,469	209,204	267,428
2014	203,756	10,144	213,900	263,312
2015	209,266	10,509	219,775	259,868
2016	214,019	10,809	224,828	257,080
2017	218,886	11,128	230,014	255,945
2018	221,879	11,409	233,288	256,362
2019	225,479	11,860	237,339	255,749
2020	227,542	12,072	239,614	256,246
<b>2021</b>	<b>230,135</b>	<b>12,704</b>	<b>242,839</b>	<b>248,091</b>

**Table 12**

**Description of Actuarial Assumptions and Methods**

**Assumptions**

**Interest Rate:** 7.00% per annum, compounded annually. The components are 2.50% for inflation and 4.50% for the real rate of return. Actuarial equivalent benefits are determined based on an interest rate of 4% per year (since 1960) except, in accordance with Act 5-2017, an interest rate of 7.00% per year is used for Class T-E, Class T-F, Class T-G and Class T-H members' Option 4 partial withdrawal of accumulated member contributions and certain Class T-G and Class T-H early retirement factors.

**Separation from Service:** Illustrative rates of assumed separation from service are shown in the following table.

Age	Class T-C and Class T-D Annual Rate of:						
	Withdrawal			Death <sup>1</sup>	Disability	Early Retirement <sup>2</sup>	Superannuation Retirement
	Less Than Five Years of Service	Five Years but Less Than 10 Years of Service	10 or More Years of Service				
<b>MALES</b>							
25	21.83%	9.22%	4.55%	.022%	.01%		
30	14.93	3.84	4.55	.029	.01		
35	15.17	3.77	1.68	.038	.04		
40	16.04	4.44	1.42	.053	.06		
45	15.12	5.17	1.41	.082	.11		19.0%
50	15.81	4.96	1.89	.129	.23		19.0
55	15.54	4.96	3.63	.194	.37	14.5%	25.0
60	13.85	6.37	5.49	.289	.37	14.5	29.0
65				.447	.11		23.0
70				.699	.08		20.0
75				1.076	.08		25.0
79				1.701	.08		25.0
<b>FEMALES</b>							
25	18.33%	7.47%	3.90%	.008%	.01%		
30	15.16	5.92	3.90	.013	.02		
35	14.66	5.68	2.83	.019	.03		
40	12.86	5.16	1.67	.030	.06		
45	12.82	5.25	1.60	.046	.11		16.0%
50	13.02	5.23	2.08	.069	.18		16.0
55	13.43	5.31	3.66	.102	.29	14.5%	16.0
60	13.81	7.53	5.94	.154	.24	15.0	31.0
65				.251	.07		28.0
70				.431	.09		23.0
75				.766	.09		25.0
79				1.239	.09		25.0

1. These base mortality tables will then be projected on a generational basis using the Buck Modified scale MP-2020. Refer to the pre-retirement mortality description below.
2. Early Retirement – Age 55 with 25 years of service, but not eligible for Superannuation retirement.

Age	Class T-E, Class T-F, Class T-G and Class T-H Annual Rate of:					
	Withdrawal		Death <sup>1</sup>	Disability	Early Retirement <sup>2</sup>	Superannuation Retirement
	Less Than 10 Years of Service	10 or More Years of Service				
<b>MALES</b>						
25	17.02%	4.55%	.022%	.01%		
30	11.25	4.55	.029	.01		
35	12.09	1.68	.038	.04		
40	13.14	1.42	.053	.06		
45	13.87	1.41	.082	.11		
50	13.67	1.89	.129	.23		
55	11.91	3.63	.194	.37	14.5%	
60	11.19	5.49	.289	.37	14.5	16.3%
65	11.19		.447	.11		16.3
70	11.19		.699	.08		16.3
75	11.19		1.076	.08		16.3
79	11.19		1.701	.08		16.3
<b>FEMALES</b>						
25	14.54%	3.90%	.008%	.01%		
30	11.68	3.90	.013	.02		
35	12.39	2.83	.019	.03		
40	11.53	1.67	.030	.06		
45	10.99	1.60	.046	.11		
50	10.72	2.08	.069	.18		
55	10.75	3.66	.102	.29	14.5%	19.5%
60	11.62	5.94	.154	.24	15.0	19.5
65	11.62		.251	.07		19.5
70	11.62		.431	.09		19.5
75	11.62		.766	.09		19.5
79	11.62		1.239	.09		19.5

1. These base mortality tables will then be projected on a generational basis using the Buck Modified scale MP-2020. Refer to the pre-retirement mortality description below.
2. Early Retirement – prior to eligibility for Superannuation retirement.

**Death before Retirement:**

Male participants: 50% PubT-2010 Employee (Total Teacher dataset) and 50% PubG-2010 Employee (Total General Employees dataset) Amount Weighted Male Tables, with a 99.0% adjustment, generationally projected with Buck Modified scale MP-2020.

Female participants: 50% PubT-2010 Employee (Total Teacher dataset) and 50% PubG-2010 Employee (Total General Employees dataset) Amount Weighted Female Tables, with an 88.6% adjustment, generationally projected with Buck Modified scale MP-2020.

**Death after Retirement:**

Male annuitants: 50% PubT-2010 Retiree (Total Teacher dataset) and 50% PubG-2010 Retiree (Total General Employees dataset) Amount Weighted Male Tables, with a 99.7% adjustment, generationally projected with Buck Modified scale MP-2020.

Female annuitants: 50% PubT-2010 Retiree (Total Teacher dataset) and 50% PubG-2010 Retiree (Total General Employees dataset) Amount Weighted Female Tables, with a 95.4% adjustment, generationally projected with Buck Modified scale MP-2020.

Male disabled annuitants: Pub-2010 Disability Mortality Non-Safety Amount Weighted Male Table, with a 105.4% adjustment, generationally projected with Buck Modified scale MP-2020.

Female disabled annuitants: Pub-2010 Disability Mortality Non-Safety Amount Weighted Female Table, with a 95.0% adjustment, generationally projected with Buck Modified scale MP-2020.

Male contingent annuitants: Pub-2010 Contingent Survivor Amount Weighted Male Table, with a 106.0% adjustment, generationally projected with Buck Modified scale MP-2020.

Female contingent annuitants: Pub-2010 Contingent Annuitant Amount Weighted Female Table, with a 116.2% adjustment, generationally projected with Buck Modified scale MP-2020.

For determination of actuarial equivalence, a unisex table based on 25% males and 75% females blend of the Board approved base mortality tables to be used for actuarial valuations beginning June 30, 2021, generationally projected to 2025 with the Buck Modified MP-2020 improvement scale.

**Salary Increase:** Effective average of 4.50% per annum, compounded annually. The components are 2.50% for inflation, and 2.00% for real wage growth and merit or seniority increases. Representative values are as follows:

Age	Annual Rate of Salary Increase
20	9.65%
30	7.15
40	5.15
50	3.15
55	2.75
60	2.75
65	2.75
Over 65	2.75

**Payroll Growth:** A 3.25% per annum payroll growth assumption is used to liquidate the unfunded accrued liability based on level-percent-of-pay amortization schedules required by the Retirement Code as amended by Act 2010-120 and Act 2017-5, i.e., a schedule of 24 years for the unfunded accrued liability as of June 30, 2010 and each change in the unfunded accrued liability due to actuarial experience after the June 30, 2010 valuation. Any legislation after June 30, 2010 that increases the liability due to benefit enhancements will be funded over 10 years based on level-percent-of-pay amortization.

**MISCELLANEOUS:**

**Option 4 - Refund of Contributions Elections:** 75% of Class T-C and Class T-D and 50% of Class T-E, Class T-F, Class T-G and Class T-H members are assumed to elect a refund of contributions and a reduced annuity.

**Withdrawal Annuity:** 50% of members are assumed to commence payment immediately and 50% are assumed to defer payment to superannuation age.

**Optional Forms of Annuity Payment at Retirement:** Anticipated active member elections of optional forms of payment at retirement as follows:

- 45% will elect Maximum Straight Life Annuity (MSLA)
- 25% will elect OPTION 1 (Straight life annuity with guaranteed payments equal to present value of MSLA)
- 20% will elect OPTION 2 (100% Joint and Survivor with males 3 years older than females)
- 10% will elect OPTION 3 (50% Joint and Survivor with males 3 years older than females)
- 0% will elect OPTION 4 annuity

**Optional Forms of Payment Factors:** Actuarial equivalent benefits are determined based on a statutorily specified interest rate of 4% per year or 7.00% per annum, as applicable. The mortality basis is a blend of 25% males and 75% females blend of the Board approved base mortality tables to be used for actuarial valuations beginning June 30, 2021, generationally projected to 2025 with the Buck Modified MP-2020 improvement scale

**Health Insurance Premium Assistance:**

Elections: 63% of eligible retirees are assumed to elect premium assistance for fiscal years 2021/2022. Beginning in fiscal year 2022/2023, 62% of eligible retirees are assumed to elect premium assistance.

Administrative Expenses: Assumed equal to \$1,344,000 for fiscal year 2021/2022, \$1,415,000 for fiscal year 2022/2023 and \$1,486,000 for Fiscal year 2023/2024.

**Summary of Changes since the June 30, 2020 Valuation:**

The following is a summary of the demographic and economic assumptions recommended on the basis of the July 1, 2015 to June 30, 2020 Experience Review and approved by the Board for use effective with the June 30, 2021 actuarial valuation:

- Non-mortality related demographic assumptions as adopted by the Board of Trustees at its March 5, 2021 Board meeting
- Mortality related demographic assumptions as adopted by the Board of Trustees at its June 11, 2021 Board meeting
- Economic assumptions, which include a 7.00% interest rate, as adopted by the Board of Trustees at its June 11, 2021 Board meeting.

Beginning in fiscal year 2022/2023, 62% of eligible retirees are assumed to elect premium assistance.

Assumed administrative expenses for the Health Insurance Premium Assistance Plan changed from \$1,901,000 for fiscal year 2021/2022 to \$1,344,000, from \$1,996,000 for fiscal year 2022/2023 to \$1,415,000 and the amount of \$1,486,000 was added for the fiscal year 2023/2024.

**Methods**

**Calculations:** 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 reasonable based on the actual experience of the System.

**Asset Valuation Method:** A ten-year moving market average value of assets that recognizes the 7.00% (7.25% prior to June 30, 2021 and 7.50% prior to June 30, 2016) actuarial expected investment return immediately and spreads the difference between the actual return on the market value of assets and the expected return on the actuarial value of assets over a period of ten years. The actuarial value of assets can be no less than 70% and no more than 130% of the market value of assets.

**Actuarial Cost Method for Pension Funding:** Entry Age Normal Cost Method (modified slightly as of June 30, 2005 to use a pay-weighted average normal contribution rate). The results of each June 30 valuation normally determine the employer contribution rate for the second succeeding fiscal year. Act 120 revised the funding method effective with the June 30, 2010 valuation. Act 120 mandated that the outstanding balance of the unfunded accrued liability as of June 30, 2010, including changes in the unfunded accrued liability due to the funding reforms of Act 120, be amortized over a 24-year period, as a level percent of pay, beginning July 1, 2011. Future valuation gains and losses, and changes in the unfunded accrued liability resulting from changes in actuarial assumptions and methods, are amortized over a 24-year period, as a level percent of pay. As provided by Act 5-2017, future increases in the unfunded accrued liability due to benefit enhancement legislation will be amortized over 10-year periods, as a level percent of pay. Act 120 also modified the employer pension contribution requirements by imposing collars on the rate for fiscal years ending June 30, 2012, June 30, 2013, and on or after June 30, 2014; the pension contribution rate was limited to 3%, 3.5% and 4.5%, respectively, of total compensation of all active members, greater than the prior year's final contribution rate. Beginning with the fiscal year ending June 30, 2017, the actuarially required contribution rate was less than the collared rate and the final contribution rate was the actuarially determined contribution rate. However, as provided by Act 120, the final contribution rate cannot be less than the employer normal contribution rate.

In accordance with Act 5-2017, member shared-risk contributions cannot be used to offset the employer normal contribution rate. Instead, any increase or decrease in the unfunded accrued liability due to member shared-risk contributions shall be recognized as part of the System's actuarial experience and amortized as a level percentage of compensation over a period of 24 years beginning with the July 1 second succeeding the actuarial valuation in which the shared-risk contribution was recognized.

**Actuarial Cost Method for Health Insurance Premium Assistance Funding:** The actuarial liability equals the assets in the health insurance account, and the results of the June 30 valuation determine the contribution rate for the second succeeding fiscal year. The rate so determined is the rate necessary to establish reserves sufficient to cover administrative expenses and provide premium assistance payments for all participating eligible annuitants during the third fiscal year that follows the valuation date.

## **Data**

**Census and Assets:** The pension valuation was based on members of the Retirement System as of June 30, 2021 and does not take into account future members. All census data was supplied by the Retirement System and was subject to reasonable consistency checks. The actuaries adjust the data to account for service and pay earned by members on or before the valuation that is not reported by the Retirement System until after the actuarial valuation is performed. Asset data was supplied by the Retirement System.

For employer DC contributions, it is assumed among new employees hired on or after July 1, 2021 that 98% will become Class T-G members, 1% will become Class T-H members and 1% will become Class DC only participants.



**Table 13**

**Summary of Benefit and Contribution Provisions**

**Membership**

For valuation purposes, all employees are considered to be full coverage members. All employees who become members on and after January 1, 1966 are members of the dual coverage group. Dual coverage members contribute to both PSERS and to Social Security.

**Benefits**

**Superannuation Annuity**

Eligibility

Age 62, or age 60 with 30 years of service, or 35 years of service regardless of age. For Class T-E and Class T-F members, age 65 with a minimum of three years of service credit, or any combination of age and service that totals 92 with at least 35 years of credited service. For Class T-G members, age 67 with a minimum of three years of service, or any combination of age and service that totals 97 with at least 35 years of credited service. For Class T-H members, age 67 with a minimum of three years of service credit.

Amount

<b>Class</b>	<b>Accrual</b>	<b>Final Average Salary</b>
T-C	2.00%	For any 3 years of service
T-D	2.50%	For any 3 years of service
T-E	2.00%	For any 3 years of service
T-F	2.50%	For any 3 years of service
T-G	1.25%	For any 5 years of service
T-H	1.00%	For any 5 years of service

Based on the above table, Accrual Rate times the Final Average Salary times years of school service and intervening military service. Minimum of \$100 per year of service. The "final average salary" means the highest average annual salary.

Annual salary is subject to a limit of \$200,000, as adjusted under Section 401(a)(17) of the Internal

Revenue Code. As of June 30, 2021, the adjusted limit is \$290,000.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

For Class T-E, Class T-F, Class T-G and Class T-H members, the maximum benefit is equal to the lesser of the limit established by Section 415 of the Internal Revenue Code or 100% of final average salary.

### **Early Retirement Annuity**

Eligibility

Age 55 with 25 years of service. For Class T-G members, age 57 with 25 years of service.

Amount

Accrued benefit as of date of retirement, reduced 1/4% for each month by which commencement of payments precedes Superannuation Age.

For members who elect coverage under Class T-D, the maximum benefit is equal to the limit established by Section 415 of the Internal Revenue Code.

For Class T-E, Class T-F, Class T-G and Class T-H members, the maximum benefit is equal to the lesser of the limit established by Section 415 of the Internal Revenue Code or 100% of final average salary.

### **Withdrawal Annuity**

Eligibility

5 years of service. For Class T-E, Class T-F, Class T-G and Class T-H members, ten years of service.

Amount

Accrued benefit deferred to superannuation retirement age or an actuarially reduced benefit payable immediately. For Class T-C, Class T-D, Class T-E and Class T-F members, PSERS early retirement factors are based on the statutory interest rate of 4%. For Class T-G and T-H members with less than 25 years of service, PSERS early retirement factors from age 62 to superannuation are based on the statutory interest rate of 4%. From commencement age to age 62, PSERS early retirement factors are based on the assumed long-term return on plan assets as adopted by the Board.

### **Disability Annuity**

Eligibility

5 years of service.

Amount

The standard single life annuity if the total number of years of credited service is greater than 16.667,

otherwise the standard single life annuity multiplied by the lesser of the following ratios:  $(Y^*/Y)$  or  $(16.667/Y)$  where Y is the number of years of credited service and Y\* is the total years of credited service if the member were to continue as a school employee until superannuation retirement age (or at current age, if later). For Class T-G and Class T-H members, the standard single life annuity for this provision is based on a 2.0% accrual rate. Minimum of \$100 per year of service.

**Return of Contributions**

Eligibility	Death or separation from service and member does not qualify for other benefits.
Amount	Refund of accumulated deductions includes interest (less annuity payments received prior to death in the case of a retired member).

**Death Benefit**

Eligibility	Death of an active member or vestee who was eligible to receive an annuity.
Amount	The present value of the annuity that would have been effective if the member retired on the day before death. Option 1 assumed payable if no other option elected.

**Normal and Optional Forms of Benefits**

Normal Form (Maximum):	Life annuity with a guaranteed payment equal to member contributions with interest.
Option 1:	Reduced benefit with refund of balance of present value of annuity at retirement over payments received. If balance is less than \$5,000, benefit is paid in lump sum; otherwise, beneficiary may elect annuity and/or lump sum.
Option 2:	Joint and 100% survivorship annuity.
Option 3:	Joint and 50% survivorship annuity.
Option 4:	Benefit of equivalent actuarial value, including lump sum payment of member contributions.

**Health Insurance Premium Assistance**

Eligibility	Retired members who: (a) have 24½ or more years of service, or (b) are disability annuitants, or
-------------	--

- (c) have 15 or more years of service and who both terminated school service and retired after attaining superannuation age and
- (d) participate in the PSERS health options program or in an employer-sponsored health insurance program.

DC Only participants who terminate employment, are eligible for Medicare, have received all or part of their individual investment account and who:

- (a) have 24½ or more eligibility points, or
- (b) have 15 or more eligibility points and who both terminated school service and retired after attaining age 67 and
- (c) participate in the PSERS health options program or in an employer-sponsored health insurance program.

Amount

Participating eligible annuitants receive health insurance premium assistance payments from the Health Insurance Account equal to the lesser of \$100 per month or the actual monthly premium. All administrative expenses necessary to operate the health insurance premium assistance program are to be funded by the Health Insurance Account. The Health Insurance Account is credited with contributions of the Commonwealth and the employers.

**Contributions**

By Members

Regular member contribution:

Class	Enrollment	Contribution Rate
Members who did not elect Class T-D	Prior to July 22, 1983	5.25%
Members who did not elect Class T-D	After to July 21, 1983 but prior to July 1, 2001	6.25%
T-D	Prior to July 22, 1983	6.50%
T-D	After to July 21, 1983	7.50%
T-E		7.50%
T-F		10.30%
T-G		5.50%
T-H		4.50%

Shared-Risk contribution:

Class T-E, Class T-F, Class T-G and Class T-H members are subject to a “shared-risk” employee contribution rate. Members benefit when investments of the fund are doing well and share some of the risk when investments underperform. The member contribution rate will stay within the specified range allotted for Class T-E, Class T-F, Class T-G or Class T-H members, but could increase or decrease every three years starting July 1, 2015 depending on investment performance.

1. If the investment rate of return (less investment fees) is equal to or exceeds the assumed rate of return by more than 1.0% based on the prior ten-year period:

<b>Class</b>	<b>Decrease in Contribution Rate</b>	<b>Minimum Contribution Rate</b>
T-E	0.50%	5.50%
T-F	0.50%	8.30%
T-G	0.75%	2.5%
T-H	0.75%	1.5%

Provided the total member contribution rate is less than the member’s basic contribution rate, if the investment rate of return (less investment fees) is less than the assumed rate of return by less than 1.0% based on the prior ten-year period:

<b>Class</b>	<b>Increase in Contribution Rate</b>
T-E	0.50%
T-F	0.50%
T-G	0.75%
T-H	0.75%

2. If the investment rate of return (less investment fees) is less than assumed rate of return by more than 1.0% based on the prior ten-year period:

<b>Class</b>	<b>Increase in Contribution Rate</b>	<b>Maximum Contribution Rate</b>
T-E	0.50%	9.50%
T-F	0.50%	12.30%
T-G	0.75%	8.5%
T-H	0.75%	7.5%

Provided the total member contribution rate is greater than the member's basic contribution rate, if the investment rate of return (less investment fees) is equal to or exceeds the assumed rate of return by less than 1.0% based on the prior ten-year period:

<b>Class</b>	<b>Decrease in Contribution Rate</b>
T-E	0.50%
T-F	0.50%
T-G	0.75%
T-H	0.75%

If the Retirement System is fully funded at the time of the comparison, the increase in member contribution rate shall not be greater than zero. There shall be no increase in the member contribution rate if there has not been an equivalent increase in the employer contribution rate over the previous three-year period.

Until a full ten-year look back period is available, the investment return measurement period will begin on July 1, 2011.

By Commonwealth and School Districts

Balance of required contribution determined as normal contribution, accrued liability contribution, supplemental annuity contribution, experience adjustment factor and premium assistance contribution and the DC Plan contribution, is funded by the Commonwealth and the School District.

**Table 14**

**Summary of Membership Data as of June 30, 2021**  
(\$ Amounts in Thousands)

**Total Active Members<sup>1</sup>**

Item	Male	Female	Total
Number of Members	68,143	179,948	248,091
Total Annual Salaries <sup>8</sup>	\$ 4,183,131	\$ 9,874,395	\$ 14,057,526
Average Age <sup>9</sup>	45.6	45.5	45.5
Average Service <sup>9</sup>	12.4	12.0	12.1

<sup>1</sup>. Excludes 167,663 inactive members, non-members and vestees.

**Class T-C Members<sup>2</sup>**

Item	Male	Female	Total
Number of Members	673	1,962	2,635
Total Annual Salaries <sup>8</sup>	\$ 48,228	\$ 109,236	\$ 157,464
Average Age <sup>9</sup>	52.9	54.9	54.4
Average Service <sup>9</sup>	23.8	22.3	22.7

<sup>2</sup>. Excludes 27,222 inactive members, non-members and vestees.

**Class T-D Members<sup>3</sup>**

Item	Male	Female	Total
Number of Members	40,026	108,520	148,546
Total Annual Salaries <sup>8</sup>	\$ 3,074,340	\$ 7,124,739	\$ 10,199,079
Average Age <sup>9</sup>	48.7	49.3	49.2
Average Service <sup>9</sup>	18.3	17.1	17.4

<sup>3</sup>. Excludes 78,624 inactive members, non-members and vestees.

**Class T-E Members<sup>4</sup>**

Item	Male	Female	Total
Number of Members	16,120	41,824	57,944
Total Annual Salaries <sup>8</sup>	\$ 639,674	\$ 1,619,528	\$ 2,259,202
Average Age <sup>9</sup>	42.3	40.8	41.2
Average Service <sup>9</sup>	4.3	4.7	4.6

<sup>4</sup>. Excludes 43,477 inactive members and non-members.

**Table 14**

**Summary of Membership Data as of June 30, 2021**  
 (\$ Amounts in Thousands)

**Class T-F Members<sup>5</sup>**

Item	Male	Female	Total
Number of Members	3,951	9,815	13,766
Total Annual Salaries <sup>8</sup>	\$ 215,150	\$ 481,268	\$ 696,418
Average Age <sup>9</sup>	41.4	39.3	39.9
Average Service <sup>9</sup>	5.3	5.0	5.1

<sup>5</sup> Excludes 3,453 inactive members and non-members.

**Class T-G Members<sup>6</sup>**

Item	Male	Female	Total
Number of Members	7,348	17,713	25,061
Total Annual Salaries <sup>8</sup>	\$ 204,834	\$ 535,907	\$ 740,741
Average Age <sup>9</sup>	37.7	35.9	36.4
Average Service <sup>9</sup>	0.8	0.9	0.9

<sup>6</sup> Excludes 14,865 inactive members and non-members.

**Class T-H Members<sup>7</sup>**

Item	Male	Female	Total
Number of Members	25	114	139
Total Annual Salaries <sup>8</sup>	\$ 905	\$ 3,717	\$ 4,622
Average Age <sup>9</sup>	31.6	36.7	35.8
Average Service <sup>9</sup>	1.3	1.7	1.6

<sup>7</sup> Excludes 22 inactive members and non-members.

**Normal Cost Rate by Class**

Class Membership	T-C	T-D	T-E	T-F	T-G	T-H	DC Only
1. Total DB Normal Cost	11.91%	15.00%	9.98%	12.76%	6.16%	4.96%	n/a
2. Member Normal Cost	6.24%	7.50%	7.50%	10.30%	5.50%	4.52%	n/a
3. Employer DC Normal Cost	n/a	n/a	n/a	n/a	2.25%	2.00%	2.00%
4. Total Employer Normal Cost [1. - 2. + 3.]	5.67%	7.50%	2.48%	2.46%	2.91%	2.44%	2.00%



**Table 14**

**Summary of Membership Data as of June 30, 2021**  
(\$ Amounts in Thousands)

**DC Only Participants**

Item	Male	Female	Total
Number of Members	14	40	54
Total Annual Salaries <sup>8</sup>	\$ 761	\$ 1,076	\$ 1,837
Average Age <sup>9</sup>	47.8	42.7	44.0
Average Service <sup>9</sup>	0.8	0.7	0.7

<sup>8</sup> The salaries shown in the table above represent an annual rate of pay for the year ended June 30, 2021 for members who were in active service on June 30, 2021.

<sup>9</sup> Average completed years of age and service.

**Table 14**

**Summary of Membership Data as of June 30, 2021**  
(\$ Amounts in Thousands)

**Total Annuitants and Beneficiaries<sup>1</sup>**

Item	Number	Annual Annuities <sup>2</sup>	Average Annuities	Average Age
Annuitants				
Normal	124,765	\$ 3,708,633	\$ 29,725	74.0
Early and Withdrawal	<u>96,512</u>	<u>2,217,900</u>	\$ 22,981	68.1
Total	221,277	\$ 5,926,533	\$ 26,783	71.4
Survivors and Beneficiaries	12,704	197,276	\$ 15,529	75.8
Disabled Annuitants	<u>8,858</u>	<u>187,948</u>	\$ 21,218	65.9
Total	242,839	\$ 6,311,757	\$ 25,992	71.4

**New Annuitants and Beneficiaries**

**Who Retired Between July 1, 2020 and June 30, 2021**

Item	Number <sup>3</sup>	Annual Annuities <sup>2</sup>	Average Annuities	Average Age
Annuitants (Normal, Early and Withdrawal)	10,172	\$ 290,291	\$ 28,538	62.3
Survivors and Beneficiaries	1,271	22,222	\$ 17,484	73.3
Disabled Annuitants	<u>240</u>	<u>7,645</u>	\$ 31,854	53.8
Total	11,683	\$ 320,158	\$ 27,404	63.3

1. The median annual benefit payable to all annuitants and beneficiaries is \$20,762.
2. The annuities shown in the tables above represent the annual amount payable as of July 1, 2021 for participants who were in payment on June 30, 2021.
3. Excludes 62 members who retired after June 30, 2020 but died prior to June 30, 2021.

**Table 14**

**Distribution of Annuitants, Beneficiaries, and Survivors by Annual Pension Amount  
As of June 30, 2021**

1. All annuitants, beneficiaries, and survivors

Annual Pension Amount	Number	Average Years of Service
Under \$10,000	84,124	12
\$10,000 - \$19,999	34,418	20
\$20,000 - \$29,999	26,958	25
\$30,000 - \$39,999	29,696	29
\$40,000 - \$49,999	29,471	32
\$50,000 - \$59,999	19,997	33
\$60,000 - \$69,999	10,104	35
\$70,000 - \$79,999	4,501	36
\$80,000 - \$89,999	1,730	36
\$90,000 - \$99,999	815	36
\$100,000 or more	1,025	37
Total	242,839	23

2. Excludes annuitants, beneficiaries, and survivors with no service on file

Annual Pension Amount	Number	Average Years of Service
Under \$10,000	80,909	12
\$10,000 - \$19,999	32,752	21
\$20,000 - \$29,999	26,131	26
\$30,000 - \$39,999	29,316	29
\$40,000 - \$49,999	29,238	32
\$50,000 - \$59,999	19,890	34
\$60,000 - \$69,999	10,060	35
\$70,000 - \$79,999	4,485	36
\$80,000 - \$89,999	1,725	36
\$90,000 - \$99,999	811	36
\$100,000 or more	1,021	37
Total	236,338	23

**Table 14**

**Distribution of Annuitants, Beneficiaries, and Survivors by Class Membership  
As of June 30, 2021**

Status	Class Membership							Total
	TC	TD	TE	TF	TG	TH	Missing Class	
Annuitants (Normal, Early and Withdrawal)	49,506	170,649	957	163	2	0	0	221,277
Disabled Annuitants	2,452	6,349	48	8	0	0	1	8,858
Survivors and Beneficiaries*	N/A	N/A	N/A	N/A	N/A	N/A	12,704	12,704
<b>Total</b>	<b>51,958</b>	<b>176,998</b>	<b>1,005</b>	<b>171</b>	<b>2</b>	<b>0</b>	<b>12,705</b>	<b>242,839</b>

\* Class membership for survivors and beneficiaries is not provided on the data used for the valuation.

**Exhibit I**

**Active Membership Data as of June 30, 2021  
Number and Average Annual Salary\***

Age	Service									Total	
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+		
<b>Under 25</b>	6,440 \$29,131	57 \$32,343									6,497 \$29,159
<b>25-29</b>	13,242 \$39,795	3,945 \$54,544	28 \$48,371								17,215 \$43,189
<b>30-34</b>	9,074 \$38,006	11,315 \$58,432	3,916 \$66,465	38 \$45,679							24,343 \$52,090
<b>35-39</b>	7,187 \$33,830	6,098 \$56,163	13,465 \$70,803	5,343 \$79,038	26 \$63,803						32,119 \$61,115
<b>40-44</b>	7,446 \$29,107	4,527 \$48,046	6,102 \$68,392	13,827 \$82,987	3,781 \$89,823	10 \$55,363					35,693 \$65,536
<b>45-49</b>	6,687 \$26,532	4,477 \$41,675	4,230 \$59,023	6,235 \$78,014	11,055 \$90,300	2,269 \$93,182	35 \$59,986				34,988 \$66,076
<b>50-54</b>	5,796 \$26,319	4,712 \$37,124	4,977 \$49,563	5,467 \$66,139	6,494 \$83,591	7,558 \$92,542	1,855 \$89,493	18 \$53,712			36,877 \$63,589
<b>55-59</b>	4,279 \$24,920	3,650 \$34,100	4,545 \$42,521	5,501 \$53,046	4,765 \$65,250	3,102 \$80,658	3,276 \$88,118	512 \$81,376	32 \$55,762		29,662 \$54,258
<b>60-64</b>	3,227 \$22,016	2,596 \$31,915	2,995 \$39,229	4,252 \$48,530	3,950 \$54,576	2,087 \$63,286	1,021 \$72,669	520 \$80,844	169 \$69,711		20,817 \$45,799
<b>Over 64</b>	2,746 \$15,821	1,724 \$24,342	1,454 \$33,259	1,304 \$42,951	1,171 \$50,301	694 \$52,936	418 \$54,605	159 \$63,658	210 \$78,116		9,880 \$33,883
<b>Total</b>	66,124 \$31,311	43,101 \$47,538	41,712 \$59,642	41,967 \$70,857	31,242 \$78,989	15,720 \$84,633	6,605 \$83,846	1,209 \$78,405	411 \$72,920		248,091 \$56,663

\* Does not include the 54 DC only participants

**Exhibit II**

**The Number of Average Annual Annuity as of June 30, 2021**

**Retired on Account of Superannuation, Early Retirement and Those  
in Receipt of Withdrawal Annuities**

Age	Years of Service									Total
	0-4 <sup>1</sup>	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	
<b>Under 50</b>		4,381	1,373	415	130	13				6,312
		\$945	\$3,020	\$7,422	\$14,891	\$32,500				\$2,174
<b>50-54</b>		1,957	990	473	246	195	76	8		3,945
		\$1,163	\$3,131	\$8,177	\$17,079	\$37,594	\$65,619	\$50,340		\$6,632
<b>55-59</b>		2,044	1,487	928	623	1,094	2,060	632	4	8,872
		\$1,577	\$3,703	\$9,522	\$17,233	\$38,356	\$52,178	\$59,327	\$58,283	\$24,288
<b>60-64</b>	76	3,087	3,437	3,119	3,027	3,299	4,964	2,662	212	23,883
	\$5,609	\$2,757	\$6,331	\$13,797	\$23,835	\$36,039	\$50,701	\$60,447	\$68,713	\$28,972
<b>65-69</b>	597	4,263	5,817	5,977	6,119	6,659	10,258	6,700	747	47,137
	\$2,000	\$3,738	\$7,083	\$14,687	\$23,683	\$34,386	\$48,102	\$59,803	\$64,551	\$31,023
<b>70-74</b>	1,451	3,717	6,456	5,450	5,527	6,599	14,766	10,585	1,225	55,776
	\$1,481	\$4,006	\$5,973	\$13,170	\$21,939	\$31,623	\$44,328	\$56,886	\$69,332	\$32,253
<b>75-79</b>	1,405	2,190	3,903	3,564	3,304	4,017	9,768	5,653	786	34,590
	\$1,134	\$3,446	\$5,074	\$10,734	\$18,254	\$27,487	\$37,041	\$50,861	\$64,515	\$27,117
<b>80-84</b>	945	1,254	2,398	2,254	2,433	2,738	4,362	3,594	648	20,626
	\$986	\$2,842	\$4,426	\$8,814	\$14,068	\$22,331	\$31,518	\$39,304	\$53,824	\$21,524
<b>85-89</b>	470	678	1,560	1,537	1,728	1,818	2,134	1,594	766	12,285
	\$761	\$2,288	\$3,663	\$6,747	\$11,670	\$18,027	\$26,842	\$36,159	\$43,931	\$17,868
<b>Over 89</b>	331	431	1,106	1,116	1,305	1,316	1,030	778	438	7,851
	\$865	\$2,046	\$3,407	\$6,574	\$11,275	\$17,086	\$23,920	\$31,273	\$41,287	\$14,842
<b>Total</b>	5,275	24,002	28,527	24,833	24,442	27,748	49,418	32,206	4,826	221,277
	\$1,316	\$2,605	\$5,405	\$11,848	\$19,827	\$30,023	\$42,360	\$53,169	\$59,112	\$26,783

1. Includes 39 annuitant records with no service information provided.

**Exhibit III**

**The Number and Average Annual Annuity as of June 30, 2021**

**Beneficiaries and Survivor Annuitants**

<b>Age</b>	<b>Years of Service</b>								<b>Total</b>
	<b>0-9<sup>1</sup></b>	<b>10-14</b>	<b>15-19</b>	<b>20-24</b>	<b>25-29</b>	<b>30-34</b>	<b>35-39</b>	<b>40+</b>	
<b>Under 50</b>	237	17	25	12	12	18	16	3	340
	\$8,248	\$4,044	\$4,307	\$7,282	\$9,378	\$10,713	\$14,813	\$31,220	\$7,250
<b>50-54</b>	114	14	25	21	29	28	13	2	246
	\$11,571	\$2,617	\$5,053	\$9,689	\$9,829	\$13,694	\$7,524	\$8,372	\$8,819
<b>55-59</b>	172	20	24	31	49	65	37	5	403
	\$14,620	\$7,822	\$7,195	\$9,161	\$13,005	\$13,601	\$18,290	\$35,518	\$11,808
<b>60-64</b>	373	42	57	36	61	127	103	22	821
	\$17,049	\$6,506	\$8,788	\$10,835	\$15,817	\$17,891	\$19,096	\$17,966	\$13,881
<b>65-69</b>	594	72	96	115	118	251	214	38	1,498
	\$24,777	\$10,734	\$12,622	\$15,786	\$18,474	\$22,029	\$24,151	\$18,145	\$18,221
<b>70-74</b>	961	119	116	134	155	379	328	65	2,257
	\$27,904	\$10,513	\$15,471	\$15,266	\$19,676	\$23,487	\$27,130	\$31,644	\$20,505
<b>75-79</b>	1,127	115	108	96	120	257	222	45	2,090
	\$24,842	\$9,956	\$12,047	\$14,184	\$17,481	\$18,142	\$27,718	\$29,505	\$17,995
<b>80-84</b>	1,193	113	109	114	118	201	142	67	2,057
	\$18,177	\$8,764	\$10,387	\$13,999	\$15,679	\$17,424	\$20,350	\$32,274	\$14,630
<b>85-89</b>	1,001	70	70	92	97	104	96	34	1,564
	\$17,551	\$8,522	\$10,001	\$11,888	\$13,143	\$15,022	\$19,960	\$24,632	\$12,614
<b>Over 89</b>	1,035	59	61	78	65	59	52	19	1,428
	\$13,910	\$8,119	\$9,719	\$12,242	\$13,137	\$14,812	\$17,899	\$24,168	\$10,841
<b>Total<sup>2</sup></b>	6,807	641	691	729	824	1,489	1,223	300	12,704
	\$13,929	\$9,001	\$11,057	\$13,487	\$16,148	\$19,318	\$23,659	\$27,388	\$15,529

1. Includes 6,363 beneficiary or survivor annuitant records with no service information provided.

2. In addition, there are 1,678 beneficiaries who are only entitled to a pending lump sum distribution.

**Exhibit IV**

**The Number and Average Annual Annuity as of June 30, 2021**

**Retired on Account of Disability**

Age	Years of Service									Total	
	0-4	5-9 <sup>1</sup>	10-14	15-19	20-24	25-29	30-34	35-39	40+		
<b>Under 50</b>		154	143	90	40	4	1				432
		\$16,727	\$22,831	\$29,351	\$37,754	\$45,693	\$74,559				\$23,726
<b>50-54</b>		135	137	143	119	57	8				599
		\$14,156	\$18,103	\$27,849	\$37,942	\$57,954	\$57,003				\$27,793
<b>55-59</b>		274	278	228	187	142	32	2			1,143
		\$12,340	\$15,547	\$21,685	\$34,410	\$46,083	\$60,545	\$44,071			\$24,192
<b>60-64</b>		382	389	373	286	197	73	1			1,701
		\$10,615	\$14,007	\$20,072	\$29,741	\$41,949	\$46,870	\$39,632			\$21,882
<b>65-69</b>		390	446	335	333	279	109	2			1,894
		\$9,824	\$13,507	\$18,253	\$26,597	\$38,442	\$47,245	\$57,894			\$21,551
<b>70-74</b>		282	308	243	270	327	166	1	4		1,601
		\$8,265	\$11,349	\$16,161	\$24,264	\$33,761	\$46,065	\$13,560	\$25,930		\$21,929
<b>75-79</b>		143	179	151	159	126	25				783
		\$7,704	\$9,188	\$12,446	\$20,065	\$28,524	\$40,414				\$15,862
<b>80-84</b>		81	106	88	76	54	14	2	1		422
		\$5,274	\$7,830	\$10,127	\$15,919	\$23,251	\$32,560	\$42,997	\$10,189		\$12,241
<b>85-89</b>		33	53	56	29	14	5				190
		\$4,557	\$6,792	\$8,627	\$15,857	\$20,148	\$22,357				\$9,722
<b>Over 89</b>		27	33	10	13	8	1		1		93
		\$3,672	\$6,386	\$10,274	\$12,672	\$20,768	\$20,150		\$54,601		\$8,799
<b>Total</b>		1,901	2,072	1,717	1,512	1,208	434	8	6		8,858
		\$10,449	\$13,552	\$18,901	\$27,380	\$37,547	\$46,738	\$42,889	\$28,085		\$21,218

1. Includes 49 annuitant records with no service information provided.



**Exhibit V**

**Annuitant and Beneficiary Membership Data as of June 30, 2021**

**Number and Average Annual Benefit  
Excludes Partial Lump Sum Payments**

Age Last Birthday	Number	Annual Benefit (Thousands)	Average Annual Benefit
<b>Annuitants (Normal, Early and Withdrawal)</b>			
Under 60	19,129	\$ 255,369	\$ 13,350
60 - 64	23,883	691,931	28,972
65 - 69	47,137	1,462,335	31,023
70 - 74	55,776	1,798,936	32,253
75 - 79	34,590	937,971	27,117
Over 79	40,762	779,991	19,135
Total	221,277	\$ 5,926,533	\$ 26,783
<b>Survivors and Beneficiaries</b>			
Under 60	989	\$ 9,393	\$ 9,498
60 - 64	821	11,396	13,881
65 - 69	1,498	27,294	18,221
70 - 74	2,257	46,279	20,505
75 - 79	2,090	37,609	17,995
Over 79	5,049	65,304	12,934
Total	12,704	\$ 197,276	\$ 15,529
<b>Disabled Annuitants</b>			
Under 60	2,174	\$ 54,549	\$ 25,092
60 - 64	1,701	37,221	21,882
65 - 69	1,894	40,818	21,551
70 - 74	1,601	35,109	21,929
75 - 79	783	12,420	15,863
Over 79	705	7,831	11,108
Total	8,858	\$ 187,948	\$ 21,218
<b>Grand Total Average Annual Benefit</b>	242,839	\$ 6,311,757	\$ 25,992

**Exhibit VI**

**10-Year History of Membership Data**

**Active Members**

Valuation as of June 30	Number of Active Members	Percentage Change in Membership	Total Annualized Payroll (Thousands) <sup>1</sup>	Percentage Change in Payroll
2021	248,091	(3.18%)	\$ 14,057,526	0.60%
2020	256,246	0.19%	13,974,295	2.21%
2019	255,749	(0.24%)	13,671,927	2.19%
2018	256,362	0.16%	13,379,041	2.65%
2017	255,945	(0.44%)	13,033,919	1.42%
2016	257,080	(1.07%)	12,851,289	1.37%
2015	259,868	(1.31%)	12,678,213	0.45%
2014	263,312	(1.54%)	12,620,862	0.35%
2013	267,428	(2.22%)	12,577,105	(1.08%)
2012	273,504	(2.02%)	12,714,371	(1.52%)

1. The salaries shown represent an annual rate of pay for the year ending June 30<sup>th</sup> for members who were in active service on June 30<sup>th</sup>.

**Exhibit VI**

(Continued)

**10-Year History of Membership Data**

**The Number and Annual Annuities of Annuitant and Survivor Annuitant Members**

Year Ended June 30	Number	Annual Annuities <sup>1</sup> (Millions)	Average Annual Annuities	Additions	Annual Annuities (Millions)	Deletions	Annual Annuities (Millions)	Percentage Change in Membership	Percentage Change in Annuities
2021	242,839	\$ 6,311.8	\$ 25,992	11,682	\$ 320.2	8,457	\$ 135.9	1.35%	2.28%
2020	239,614	6,170.9	25,753	9,708	256.1	7,433	115.6	0.96%	1.97%
2019	237,339	6,051.6	25,498	10,553	246.6	6,502	107.0	1.74%	2.11%
2018	233,288	5,926.7	25,405	11,806	235.3	8,532	98.6	1.42%	1.90%
2017	230,014	5,816.4	25,287	12,876	274.2	7,690	102.1	2.31%	2.65%
2016	224,828	5,666.4	25,203	12,686	267.1	7,633	93.5	2.30%	2.64%
2015	219,775	5,520.6	25,119	15,017	297.3	9,142	91.7	2.75%	3.39%
2014	213,900	5,339.5	24,962	15,225	300.5	8,878	84.9	3.06%	3.74%
2013	207,553	5,147.1	24,800	16,404	377.6	10,866	83.7	2.74%	5.63%
2012	202,015	4,872.9	24,121	14,579	332.7	7,186	66.6	3.80%	4.78%

1. The annual annuities added and deleted are for the annuitants and survivor annuitants who were added and deleted. Changes in annuities for continuing payees may also occur due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

**The Number and Annual Annuities of Annuitant Members**

Year Ended June 30	Number	Annual Annuities <sup>2</sup> (Millions)	Average Annual Annuities	Additions	Annual Annuities (Millions)	Deletions	Annual Annuities (Millions)	Percentage Change in Membership	Percentage Change in Annuities
2021	230,135	\$ 6,114.5	\$ 26,569	10,474	\$ 297.9	7,881	\$ 152.3	1.14%	2.10%
2020	227,542	5,988.6	26,319	8,841	239.6	6,778	123.5	0.91%	1.92%
2019	225,479	5,875.5	26,058	9,575	228.8	5,975	104.0	1.62%	1.97%
2018	221,879	5,762.3	25,970	10,911	220.2	7,918	93.0	1.37%	1.80%
2017	218,886	5,660.4	25,860	11,942	257.9	7,075	95.8	2.27%	2.54%
2016	214,019	5,520.0	25,792	11,807	249.8	7,054	88.1	2.27%	2.54%
2015	209,266	5,383.3	25,725	12,624	279.2	7,114	86.5	2.70%	3.30%
2014	203,756	5,211.4	25,577	12,915	283.9	6,894	80.0		

2. The annual annuities added and deleted are for the annuitants who were added and deleted. Changes in annuities for continuing payees may also occur due to finalization of benefit calculations and due to the commencement of supplemental annuity payments.

**Exhibit VII**

**Detailed Tabulations of the Data**

**Table 1**

**The Number and Annual Salaries of Members in Active Service Distributed  
by Age as of June 30, 2021**

Age	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
17	9	\$ 54,887	5	\$ 28,383	14	\$ 83,270
18	32	351,826	25	303,271	57	655,097
19	83	1,356,092	112	1,377,563	195	2,733,655
20	182	2,670,999	179	2,060,999	361	4,731,998
21	226	3,908,190	293	4,226,594	519	8,134,784
22	324	6,478,836	563	13,167,304	887	19,646,140
23	544	14,818,397	1,351	45,828,786	1,895	60,647,183
24	704	21,790,477	1,865	71,023,533	2,569	92,814,010
25	778	24,841,719	2,089	83,499,518	2,867	108,341,237
26	844	31,849,797	2,320	98,525,360	3,164	130,375,157
27	913	35,489,810	2,505	112,250,517	3,418	147,740,327
28	1,052	42,597,357	2,708	125,488,031	3,760	168,085,388
29	1,066	46,047,580	2,940	142,905,937	4,006	188,953,517
30	1,168	52,992,283	3,218	159,047,863	4,386	212,040,146
31	1,259	61,887,136	3,442	175,016,798	4,701	236,903,934
32	1,246	62,623,599	3,498	181,229,200	4,744	243,852,799
33	1,330	70,404,395	3,621	193,856,480	4,951	264,260,875
34	1,499	85,672,974	4,062	225,299,599	5,561	310,972,573
35	1,627	95,183,239	4,246	243,688,711	5,873	338,871,950
36	1,704	105,757,059	4,490	267,505,353	6,194	373,262,412
37	1,668	106,197,411	4,630	278,743,696	6,298	384,941,107
38	1,701	111,292,011	4,937	301,278,411	6,638	412,570,422
39	1,928	131,876,699	5,188	321,418,067	7,116	453,294,766
40	1,973	136,488,522	5,307	332,971,896	7,280	469,460,418
41	1,967	139,760,680	5,261	334,677,407	7,228	474,438,087
42	1,984	140,846,159	5,167	328,431,536	7,151	469,277,695
43	1,936	140,789,865	4,993	315,744,971	6,929	456,534,836
44	2,029	148,351,874	5,076	321,121,700	7,105	469,473,574
45	1,968	146,544,499	4,796	304,186,414	6,764	450,730,913
46	1,913	141,372,831	4,931	310,412,056	6,844	451,784,887
47	1,949	145,664,644	4,911	305,950,627	6,860	451,615,271
48	1,993	151,370,953	4,997	311,452,247	6,990	462,823,200
49	2,131	160,311,370	5,399	334,612,508	7,530	494,923,878
50	2,285	170,287,843	5,928	368,177,916	8,213	538,465,759
51	2,033	151,612,630	5,736	354,846,536	7,769	506,459,166
52	1,977	145,306,189	5,363	321,764,596	7,340	467,070,785
53	1,848	134,904,331	5,039	295,220,012	6,887	430,124,343
54	1,762	123,967,339	4,906	278,890,798	6,668	402,858,137
55	1,728	117,537,374	4,534	246,632,357	6,262	364,169,731
56	1,550	103,603,190	4,676	241,120,903	6,226	344,724,093

**Table 1**  
(Continued)

**The Number and Annual Salaries off Members in Active Service Distributed  
by Age as of June 30, 2021**

Age	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
57	1,546	\$ 100,714,112	4,488	\$ 224,332,261	6,034	\$ 325,046,373
58	1,400	86,451,400	4,246	208,831,197	5,646	295,282,597
59	1,344	79,165,331	4,150	201,014,220	5,494	280,179,551
60	1,329	74,870,586	4,115	190,944,278	5,444	265,814,864
61	1,189	63,851,186	3,638	160,483,551	4,827	224,334,737
62	1,049	53,729,195	2,923	127,597,184	3,972	181,326,379
63	951	45,907,847	2,588	107,796,124	3,539	153,703,971
64	825	39,739,909	2,210	88,484,366	3,035	128,224,275
65	633	27,755,570	1,477	59,172,956	2,110	86,928,526
66	536	21,692,354	1,070	40,464,932	1,606	62,157,286
67	416	15,267,891	798	28,626,339	1,214	43,894,230
68	351	12,892,487	622	21,437,669	973	34,330,156
69	310	9,323,785	490	15,717,618	800	25,041,403
70	233	7,289,994	380	10,874,522	613	18,164,516
71	195	5,724,652	313	9,442,913	508	15,167,565
72	194	5,113,917	256	5,770,074	450	10,883,991
73	158	4,432,390	204	5,254,637	362	9,687,027
74	149	3,943,075	185	4,229,430	334	8,172,505
75	89	2,065,777	102	2,317,557	191	4,383,334
76	84	2,364,425	81	1,949,080	165	4,313,505
77	60	1,415,131	74	1,609,673	134	3,024,804
78	63	1,519,789	54	932,999	117	2,452,788
79	43	1,262,888	55	988,206	98	2,251,094
80	23	480,049	37	570,428	60	1,050,477
81	20	370,324	21	405,416	41	775,740
82	15	322,389	15	309,031	30	631,420
83	9	231,133	17	331,724	26	562,857
84	7	135,660	9	156,157	16	291,817
85	5	132,693	12	157,644	17	290,337
86	2	41,593	7	163,477	9	205,070
87	2	60,573	4	44,713	6	105,286
<b>Total</b>	<b>68,143</b>	<b>\$ 4,183,131,171</b>	<b>179,948</b>	<b>\$ 9,874,394,830</b>	<b>248,091</b>	<b>\$ 14,057,526,001</b>

**Table 2**

**The Number and Annual Salaries of Members in Active Service Distributed by Years of Credited Service as of June 30, 2021**

Service	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
0	4,700	\$ 60,644,766	6,099	\$ 97,634,793	10,799	\$ 158,279,559
1	4,936	133,636,965	12,004	352,893,238	16,940	486,530,203
2	3,975	142,991,504	10,888	365,090,712	14,863	508,082,216
3	3,228	127,617,778	9,406	348,115,041	12,634	475,732,819
4	2,764	121,298,269	8,124	320,458,026	10,888	441,756,295
5	2,472	115,834,027	7,743	323,017,820	10,215	438,851,847
6	2,206	111,711,780	7,014	311,410,688	9,220	423,122,468
7	2,104	110,496,961	6,568	308,856,456	8,672	419,353,417
8	2,093	115,801,999	5,970	290,586,836	8,063	406,388,835
9	1,675	95,245,169	5,256	265,982,817	6,931	361,227,986
10	1,620	97,538,513	5,168	267,687,574	6,788	365,226,087
11	1,850	117,341,573	5,901	324,763,620	7,751	442,105,193
12	2,037	134,651,779	6,453	374,521,494	8,490	509,173,273
13	2,218	150,060,236	6,996	417,435,386	9,214	567,495,622
14	2,254	160,161,995	7,215	443,612,275	9,469	603,774,270
15	2,252	165,394,918	6,966	448,017,953	9,218	613,412,871
16	2,281	175,812,504	6,806	454,623,899	9,087	630,436,403
17	2,365	187,905,774	6,445	446,683,088	8,810	634,588,862
18	1,952	159,379,901	5,507	385,847,729	7,459	545,227,630
19	1,906	160,331,638	5,487	389,654,286	7,393	549,985,924
20	1,854	155,901,722	5,152	371,763,850	7,006	527,665,572
21	1,729	149,909,307	5,125	377,109,525	6,854	527,018,832
22	2,129	190,569,046	4,642	349,702,939	6,771	540,271,985
23	1,779	158,928,671	3,855	298,018,539	5,634	456,947,210
24	1,679	156,329,288	3,298	259,545,648	4,977	415,874,936
25	1,321	121,243,899	2,754	219,827,647	4,075	341,071,546
26	1,166	107,185,997	2,415	194,947,262	3,581	302,133,259
27	958	87,566,131	2,073	170,420,508	3,031	257,986,639
28	1,132	104,891,263	1,865	152,236,781	2,997	257,128,044
29	679	60,885,812	1,357	111,224,357	2,036	172,110,169
30	568	50,767,832	1,204	97,907,188	1,772	148,675,020
31	547	48,714,139	1,054	86,458,897	1,601	135,173,036
32	515	44,874,786	895	72,010,397	1,410	116,885,183
33	339	30,503,651	702	57,748,838	1,041	88,252,489
34	264	23,472,287	517	41,346,598	781	64,818,885
35	163	13,783,729	273	21,714,515	436	35,498,244
36	109	9,086,299	190	14,619,426	299	23,705,725
37	80	6,545,523	129	9,348,096	209	15,893,619
38	69	5,351,213	86	6,488,175	155	11,839,388
39	48	3,499,437	62	4,355,040	110	7,854,477

**Table 2  
(Continued)**

**The Number and Annual Salaries of Members in Active Service Distributed by  
Years of Credited Service as of June 30, 2021**

Service	Male		Female		Total	
	Number	Salaries	Number	Salaries	Number	Salaries
40	35	\$ 2,239,807	54	\$ 3,830,507	89	\$ 6,070,314
41	27	2,028,419	56	4,155,697	83	6,184,116
42	27	1,790,734	42	3,178,131	69	4,968,865
43	11	1,022,443	27	1,993,731	38	3,016,174
44	4	439,455	15	994,164	19	1,433,619
45	11	849,530	16	1,019,652	27	1,869,182
46	2	146,466	21	1,281,560	23	1,428,026
47	3	161,640	13	1,127,335	16	1,288,975
48	3	300,640	15	1,424,583	18	1,725,223
49	1	95,864	6	493,713	7	589,577
50			6	409,348	6	409,348
51	1	51,253	4	201,504	5	252,757
52			3	181,374	3	181,374
53			1	112,148	1	112,148
54	1	40,500	3	191,405	4	231,905
55	1	96,339	1	41,580	2	137,919
56			1	70,441	1	70,441
<b>Total</b>	68,143	\$4,183,131,171	179,948	\$9,874,394,830	248,091	\$ 14,057,526,001



**Table 3**

**The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2021**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

Age	Male		Female		Total	
	Number	Annunities	Number	Annunities	Number	Annunities
28	1	\$ 73			1	\$ 73
29	2	781			2	781
30	8	5,164	5	\$ 1,354	13	6,518
31	21	17,920	8	4,964	29	22,884
32	16	14,556	19	13,106	35	27,662
33	30	33,120	49	40,194	79	73,314
34	44	42,503	70	58,384	114	100,887
35	73	85,718	118	104,533	191	190,251
36	86	97,837	133	131,658	219	229,495
37	68	94,664	153	179,386	221	274,050
38	109	132,930	222	278,763	331	411,693
39	124	218,760	197	314,468	321	533,228
40	127	220,053	213	346,755	340	566,808
41	159	330,245	251	446,548	410	776,793
42	152	307,982	270	528,297	422	836,279
43	157	373,926	264	516,143	421	890,069
44	144	304,462	303	578,232	447	882,694
45	136	344,212	335	705,354	471	1,049,566
46	180	575,732	330	774,830	510	1,350,562
47	128	548,612	386	998,174	514	1,546,786
48	196	803,551	388	1,120,784	584	1,924,335
49	202	820,538	435	1,209,426	637	2,029,964
50	199	700,225	522	1,676,339	721	2,376,564
51	226	1,396,942	546	2,352,573	772	3,749,515
52	234	1,754,719	532	2,898,803	766	4,653,522
53	220	1,440,431	568	2,698,114	788	4,138,545
54	262	4,046,008	636	7,200,540	898	11,246,548
55	365	8,682,660	845	14,728,142	1,210	23,410,802
56	419	10,156,043	1,053	18,567,387	1,472	28,723,430
57	513	16,382,743	1,240	26,058,304	1,753	42,441,047
58	583	18,333,665	1,422	35,387,874	2,005	53,721,539
59	689	22,880,201	1,743	44,302,149	2,432	67,182,350
60	810	29,480,076	2,107	57,169,762	2,917	86,649,838
61	929	33,085,189	2,388	66,557,363	3,317	99,642,552
62	1,258	42,060,298	3,666	93,817,696	4,924	135,877,994
63	1,439	50,578,432	4,516	120,472,764	5,955	171,051,196
64	1,640	58,829,977	5,130	139,879,788	6,770	198,709,765
65	1,805	62,665,766	5,765	157,747,618	7,570	220,413,384
66	2,154	71,713,629	6,488	181,416,273	8,642	253,129,902
67	2,261	76,637,123	7,144	211,064,265	9,405	287,701,388
68	2,663	94,917,303	7,639	237,477,773	10,302	332,395,076
69	2,964	107,935,887	8,254	260,759,109	11,218	368,694,996

**Table 3  
(Continued)**

**The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2021**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
70	3,097	\$ 116,311,180	8,096	\$ 259,229,756	11,193	\$ 375,540,936
71	3,180	119,434,979	7,701	239,568,556	10,881	359,003,535
72	3,404	127,675,316	7,486	229,734,566	10,890	357,409,882
73	3,733	133,928,766	7,244	211,857,581	10,977	345,786,347
74	4,198	145,227,730	7,637	215,967,734	11,835	361,195,464
75	2,796	94,789,494	4,742	127,677,991	7,538	222,467,485
76	2,565	80,656,006	4,622	120,313,272	7,187	200,969,278
77	2,517	77,403,283	4,353	105,002,764	6,870	182,406,047
78	2,734	85,080,349	4,471	104,115,758	7,205	189,196,107
79	2,117	62,296,439	3,673	80,635,789	5,790	142,932,228
80	1,762	50,364,925	3,280	67,833,806	5,042	118,198,731
81	1,525	40,741,213	2,918	57,799,380	4,443	98,540,593
82	1,366	36,301,750	2,732	50,339,702	4,098	86,641,452
83	1,219	29,513,879	2,483	44,682,601	3,702	74,196,480
84	1,099	28,338,063	2,242	38,048,373	3,341	66,386,436
85	1,014	24,561,202	2,125	33,332,177	3,139	57,893,379
86	911	21,616,596	1,828	27,867,246	2,739	49,483,842
87	734	17,325,300	1,584	23,474,019	2,318	40,799,319
88	625	15,682,302	1,456	20,627,346	2,081	36,309,648
89	569	13,700,726	1,439	21,316,187	2,008	35,016,913
90	488	11,711,115	1,272	18,529,728	1,760	30,240,843
91	377	8,315,923	1,001	13,276,026	1,378	21,591,949
92	256	5,355,757	873	11,500,571	1,129	16,856,328
93	208	4,517,942	793	9,805,643	1,001	14,323,585
94	146	3,150,682	579	7,091,890	725	10,242,572
95	122	2,548,404	433	5,486,882	555	8,035,286
96	80	1,392,671	339	3,786,163	419	5,178,834
97	54	1,083,614	225	2,298,834	279	3,382,448
98	30	515,317	165	1,580,235	195	2,095,552
99	14	221,911	126	1,208,211	140	1,430,122
100	11	240,891	102	1,112,373	113	1,353,264
101	5	110,237	62	623,615	67	733,852
102	6	80,432	28	399,690	34	480,122
103			26	276,014	26	276,014
104	2	3,291	14	185,983	16	189,274
105			7	61,665	7	61,665
106			4	20,978	4	20,978
107			1	9,858	1	9,858
110	1	15,242	1	6,825	2	22,067
<b>Total</b>	<b>66,761</b>	<b>\$ 2,079,263,583</b>	<b>154,516</b>	<b>\$ 3,847,269,777</b>	<b>221,277</b>	<b>\$ 5,926,533,360</b>

**Table 3  
(Continued)**

**The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2021**

**Retired on Account of Superannuation, Early Retirement and  
Those in Receipt of Withdrawal Annuities**

<u>OPTION</u>	<u>MALE</u>		<u>FEMALE</u>	
Maximum	29,133	\$ 907,781,985	83,516	\$ 2,084,495,917
1	10,834	259,591,087	35,711	698,162,642
2	17,287	518,743,039	20,997	562,949,776
3	7,921	318,122,406	13,077	451,724,153
4	<u>1,586</u>	<u>75,025,066</u>	<u>1,215</u>	<u>49,937,289</u>
	66,761	\$ 2,079,263,583	154,516	\$ 3,847,269,777

**DEFINITION OF OPTIONS**

- Option 1 A life annuity to the member with a guaranteed payment to the beneficiary equal to the present value of the total maximum single life annuity less any amounts paid to the member prior to death.
- Option 2 A joint and one hundred percent (100%) survivor annuity payable during the lifetime of the member with the full amount of such annuity payable thereafter to the designated survivor annuitant, if living at the member's death.
- Option 3 A joint and fifty percent (50%) survivor annuity payable during the lifetime of the member with one-half of such annuity payable thereafter to the designated survivor annuitant, if living at the member's death.
- Option 4 A life annuity to the member with a special death benefit other than the normal option 1, 2, or 3 death benefit.

Note: The Option 4 totals above only reflect annuity elections that differ from the Maximum annuity or Options 1, 2 or 3. The Option 4 totals do not reflect Option 4 elections to withdraw accumulated deductions.

Table 4

The Number and Annual Annuities of Beneficiaries and Survivor Annuitants  
as of June 30, 2021

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
11	1	\$ 1,534			1	\$ 1,534
14	1	3,741			1	3,741
15			1	\$ 1,534	1	1,534
17			1	21,875	1	21,875
20	2	4,036			2	4,036
21	1	1,898	6	51,420	7	53,318
22	2	8,267	3	13,992	5	22,259
23	2	12,542	2	13,822	4	26,364
24	2	3,275			2	3,275
25	1	9,869	5	23,676	6	33,545
26	1	2,775	1	662	2	3,437
27	2	20,084	2	14,045	4	34,129
28	1	1,149	3	17,646	4	18,795
29	2	11,548	5	33,501	7	45,049
30	3	19,921	4	33,271	7	53,192
31	3	18,072	5	17,180	8	35,252
32	6	20,703	3	15,447	9	36,150
33	6	55,147	3	27,722	9	82,869
34	7	71,525	4	16,968	11	88,493
35	5	25,704	2	3,424	7	29,128
36	8	37,739	7	87,801	15	125,540
37	5	25,088	6	111,660	11	136,748
38	6	50,528	5	28,749	11	79,277
39	4	52,527	5	24,499	9	77,026
40	9	50,315	5	21,444	14	71,759
41	4	12,381	3	33,122	7	45,503
42	11	57,479	14	106,094	25	163,573
43	14	152,871	9	34,658	23	187,529
44	7	27,776	12	82,538	19	110,314
45	4	41,497	17	139,107	21	180,604
46	7	98,268	11	111,927	18	210,195
47	9	37,191	12	101,485	21	138,676
48	10	51,220	14	112,957	24	164,177
49	5	24,624	19	151,642	24	176,266
50	8	58,033	16	111,676	24	169,709
51	6	55,741	29	343,941	35	399,682
52	16	122,535	29	299,024	45	421,559
53	16	121,396	41	337,670	57	459,066
54	21	132,486	64	587,094	85	719,580
55	14	99,872	45	469,834	59	569,706
56	18	154,678	57	623,069	75	777,747
57	25	397,473	59	710,402	84	1,107,875
58	23	147,938	69	984,295	92	1,132,233
59	24	314,249	69	856,805	93	1,171,054
60	30	340,558	101	1,296,584	131	1,637,142

**Table 4  
(Continued)**

**The Number and Annual Annuities of Beneficiaries and Survivor Annuitants  
as of June 30, 2021**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
61	34	\$ 401,260	98	\$ 1,451,122	132	\$ 1,852,382
62	47	582,397	120	1,829,864	167	2,412,261
63	43	514,259	146	1,982,726	189	2,496,985
64	57	722,280	145	2,274,934	202	2,997,214
65	66	949,290	175	3,260,133	241	4,209,423
66	71	1,424,952	178	2,864,444	249	4,289,396
67	92	1,329,972	225	4,255,982	317	5,585,954
68	97	2,010,961	211	4,218,614	308	6,229,575
69	124	2,366,033	259	4,614,111	383	6,980,144
70	111	1,972,969	246	5,172,856	357	7,145,825
71	110	2,593,357	286	6,168,306	396	8,761,663
72	129	2,686,965	325	7,100,489	454	9,787,454
73	129	2,455,908	352	6,663,339	481	9,119,247
74	165	3,342,279	404	8,122,433	569	11,464,712
75	80	1,639,589	297	5,934,071	377	7,573,660
76	110	1,999,190	293	5,606,403	403	7,605,593
77	98	1,938,149	292	4,967,152	390	6,905,301
78	133	2,456,223	361	6,060,103	494	8,516,326
79	95	1,865,323	331	5,142,950	426	7,008,273
80	102	2,214,479	367	5,406,584	469	7,621,063
81	86	1,209,793	305	4,579,206	391	5,788,999
82	85	1,397,038	320	4,718,286	405	6,115,324
83	66	1,005,298	315	4,001,828	381	5,007,126
84	76	932,175	335	4,629,734	411	5,561,909
85	64	751,788	295	3,843,106	359	4,594,894
86	57	634,492	282	3,729,047	339	4,363,539
87	46	552,670	249	3,132,976	295	3,685,646
88	37	452,684	256	3,120,674	293	3,573,358
89	46	481,647	232	3,029,504	278	3,511,151
90	52	586,517	228	2,694,831	280	3,281,348
91	44	549,463	221	2,663,560	265	3,213,023
92	27	309,884	176	1,886,244	203	2,196,128
93	25	277,892	165	1,645,676	190	1,923,568
94	25	279,185	129	1,369,622	154	1,648,807
95	15	143,445	79	923,778	94	1,067,223
96	10	106,352	71	608,584	81	714,936
97	12	121,330	45	367,538	57	488,868
98	6	42,244	35	333,129	41	375,373
99	6	74,625	25	204,053	31	278,678
100	1	12,233	15	173,711	16	185,944
101			5	25,840	5	25,840
102	1	3,412	3	18,501	4	21,913
103			2	26,902	2	26,902
104	1	3,188	3	24,363	4	27,551
105			1	4,912	1	4,912
<b>Total</b>	<b>3,033</b>	<b>\$ 48,349,443</b>	<b>9,671</b>	<b>\$ 148,926,483</b>	<b>12,704</b>	<b>\$ 197,275,926</b>

**Table 5**

**The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2021**

**Retired on Account of Disability**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
30			1	\$ 13,425	1	\$ 13,425
33			2	40,153	2	40,153
34			3	69,298	3	69,298
35			4	72,538	4	72,538
36	1	\$ 21,737	5	113,032	6	134,769
37			6	117,578	6	117,578
38	6	96,230	4	83,938	10	180,168
39	4	79,144	6	144,348	10	223,492
40	4	94,783	7	160,674	11	255,457
41	8	166,349	6	151,626	14	317,975
42	2	40,630	15	366,654	17	407,284
43	6	151,283	23	581,702	29	732,985
44	8	202,278	36	932,540	44	1,134,818
45	14	306,593	29	679,876	43	986,469
46	7	134,214	37	888,548	44	1,022,762
47	11	270,931	43	1,019,553	54	1,290,484
48	21	506,453	39	942,816	60	1,449,269
49	14	375,690	60	1,425,176	74	1,800,866
50	17	462,717	66	1,819,247	83	2,281,964
51	29	874,275	82	2,541,641	111	3,415,916
52	40	1,080,822	93	2,317,273	133	3,398,095
53	40	1,306,399	90	2,384,736	130	3,691,135
54	40	1,161,762	102	2,699,194	142	3,860,956
55	45	1,171,786	118	3,299,692	163	4,471,478
56	63	1,726,551	156	4,103,383	219	5,829,934
57	68	1,734,756	164	3,671,556	232	5,406,312
58	77	1,955,166	188	4,384,087	265	6,339,253
59	74	1,703,014	190	3,901,154	264	5,604,168
60	70	1,921,242	227	4,734,768	297	6,656,010
61	93	2,421,787	229	5,080,362	322	7,502,149
62	123	3,041,237	262	5,324,174	385	8,365,411
63	104	2,235,891	238	5,095,738	342	7,331,629
64	107	2,216,506	248	5,149,697	355	7,366,203
65	117	2,467,094	261	5,156,252	378	7,623,346
66	115	2,558,973	282	5,761,267	397	8,320,240
67	117	2,652,246	287	6,138,604	404	8,790,850
68	110	2,379,232	242	5,231,085	352	7,610,317
69	104	2,599,541	259	5,873,443	363	8,472,984
70	98	2,231,031	262	6,180,398	360	8,411,429
71	101	2,283,127	219	4,919,742	320	7,202,869
72	95	2,410,591	220	4,686,812	315	7,097,403
73	89	2,265,449	218	4,352,634	307	6,618,083
74	77	1,558,783	222	4,220,185	299	5,778,968

**Table 5**  
(Continued)

**The Number and Annual Annuities of Annuitants on the Retired List  
as of June 30, 2021**

**Retired on Account of Disability**

Age	Male		Female		Total	
	Number	Annuities	Number	Annuities	Number	Annuities
75	41	\$ 765,056	136	\$ 2,282,076	177	\$ 3,047,132
76	43	1,020,213	121	1,838,832	164	2,859,045
77	43	773,721	114	1,687,164	157	2,460,885
78	41	676,075	119	1,759,434	160	2,435,509
79	28	391,031	97	1,226,778	125	1,617,809
80	27	410,586	89	1,141,100	116	1,551,686
81	23	319,454	68	750,297	91	1,069,751
82	20	264,481	50	567,072	70	831,553
83	18	249,484	67	599,835	85	849,319
84	15	186,768	45	676,643	60	863,411
85	13	149,496	39	358,168	52	507,664
86	6	72,110	32	293,468	38	365,578
87	13	153,241	34	287,520	47	440,761
88	7	75,483	20	226,128	27	301,611
89	2	30,748	24	200,803	26	231,551
90	4	45,243	17	118,989	21	164,232
91	2	13,615	16	124,355	18	137,970
92	4	99,345	15	136,729	19	236,074
93	1	14,144	14	100,759	15	114,903
94	1	25,919	7	43,146	8	69,065
95	1	3,312	2	13,497	3	16,809
96			2	24,507	2	24,507
97			2	14,617	2	14,617
99			1	1,776	1	1,776
101			2	8,052	2	8,052
104			1	10,127	1	10,127
<b>Total</b>	<b>2,472</b>	<b>\$ 56,605,818</b>	<b>6,386</b>	<b>\$ 131,342,621</b>	<b>8,858</b>	<b>\$ 187,948,439</b>

## Exhibit VIII: ASOP 51 Disclosures

Funding future retirement benefits prior to when those benefits become due involves assumptions regarding future economic and demographic experience. These assumptions are applied to calculate actuarial liabilities, current contribution requirements and the funded status of the plan. However, to the extent future experience deviates from the assumptions used, variations will occur in these calculated values. These variations create risk to the plan. Understanding the risks to the funding of the plan is important. Actuarial Standard of Practice No. 51 (ASOP 51) requires certain disclosures of potential risks to the plan and provides useful information for intended users of actuarial reports that determine plan contributions or evaluate the adequacy of specified contribution levels to support benefit provisions.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

It is important to note that not all risk is negative, but all risk should be understood and accepted based on knowledge, judgement and educated decisions. Future measurements may deviate in ways that produce positive or negative financial impacts to the Retirement System.

In the actuary's professional judgment, the following risks may reasonably be anticipated to significantly affect the Retirement System's future financial condition:

- Investment risk – potential that the investment return will be different than the 7.00% expected in the actuarial valuation
- Salary increases – potential that salary increases will be different from that assumed for the actuarial valuation
- Longevity risk – potential that participants live longer than expected from the valuation mortality assumptions
- Declining workforce – potential that future employer contribution rates will be different from expected
- Contribution risk – potential that the contribution will be different than the recommended contribution in the actuarial valuation

The following information is provided to comply with ASOP 51 and furnish beneficial information on potential risks to the plan. This list is not all-inclusive; it is an attempt to identify the most significant risks and how those risks might affect the results shown in this report.

Note that ASOP 51 does not require the actuary to evaluate the ability or willingness of the Retirement System employers to make contributions to the Retirement System when due, or to assess the likelihood or consequences of potential future changes in law. In addition, this valuation report is not intended to provide investment advice or to provide guidance on the management or reduction of risk. Buck welcomes the opportunity to assist in such matters as part of a separate project or projects utilizing the appropriate staff and resources for those objectives.



## Exhibit VIII: ASOP 51 Disclosures (continued)

### Investment Risk

Retirement System costs are very sensitive to the market return. Any lower than assumed return on assets will increase costs.

- The lower return will cause the assets to be lower than expected. This decrease in assets will increase the Retirement System cost.
- The Retirement System uses an actuarial value of assets that smooths gains and losses on market returns over a ten-year period to help control some of the volatility in costs due to investment risk.
- Historical experience of actual returns is shown on page 12. This historical experience illustrates how returns can vary over time.

### Salary increases

Retirement System costs are sensitive to salary increases since benefits at retirement are pay related.

- Salaries greater than expected would lead to higher liabilities, larger unfunded liabilities and larger employer contributions.
- Salaries less than expected would lead to lower liabilities but may increase employer contribution rates due to lower employer payroll.

### Longevity Risk

Retirement System costs will be increased as participants are expected to live longer. This is because:

- Benefits are paid over a longer lifetime when life expectancy is expected to increase. The longer duration of payments leads to higher liabilities.
- Health care has been improving, which increases the life expectancy of participants. As health care improves, Retirement System costs will increase.
- The mortality assumption for the Retirement System does assume future improvement in mortality. Any improvement in future mortality greater than that reflected in the current mortality assumption would lead to increased Retirement System costs.

### Declining workforce

Employer contributions are based on a percentage of participants' salaries. If the required dollar amount of contributions remains level or increases, a declining active workforce will result in higher contribution rates in order to meet required contribution levels.

### Contribution Risk

The Retirement System contribution is a budgeted amount. There is a risk associated with the employer's contribution when the budgeted amount and recommended amount differ. This is because:

- When the budgeted contribution is lower than the recommended contribution the Retirement System may not be sustainable in the long term.
- Any underpayment of the contribution will increase future contribution amounts to help pay off the additional Unfunded Actuarial Accrued Liability associated with any lower than recommended contribution amounts.
- Historical comparison of actuarially determined contributions to actual contributions are shown on page 20. This history shows action has been taken to mitigate this risk by contributing the actuarially determined contribution for pensions since the fiscal year ending June 30, 2017.

## Exhibit VIII: ASOP 51 Disclosures (continued)

### Other Risk Considerations

Other possible risks (but this is not an exhaustive list) to be considered that may impact the Retirement System funding:

- The valuation assumes 75% of Class T-C and Class T-D and 50% of Class TE, Class T-F, Class T-G and Class T-H members are assumed to elect an Option 4 refund of member contributions and a reduced annuity at benefit commencement. Actual experience from this assumption could affect the liquidity of the Retirement System if more retirees are electing a lump sum than are expected in the valuation.
- Investment risk is mitigated to some extent by the “shared-risk” provisions of the Retirement System and its potential impact on the member contribution rates for Class T-E, Class T-F, Class T-G and Class T-H members. Poor asset returns over a period of time could trigger increased member contributions for these classes of members. As of the June 30, 2020 valuation, the shared-risk provisions increased member contributions effective July 1, 2021 through June 30, 2024. These increased member contributions would offset some of the poor asset returns for the Retirement System.
- Members who retire after 25 years of service and are at least age 55 (age 57 for Class T-G members) may commence their benefits prior to their superannuation date with subsidized early retirement factors. If more retirees retire and commence their benefits under this early retirement provision than are assumed based on the assumptions outlined on page 23, the Retirement System may pay out subsidized benefits for a longer period of time thus increasing liabilities and costs.

### Plan Maturity Measures

There are certain measures that may aid in understanding the significant risks to the Retirement System.

Ratio of Retired Liability to Total Liability (Pension Only)	June 30, 2020 (000)	June 30, 2021 (000)
1. Retirees and Beneficiaries	58,415,383	61,168,172
2. Total Accrued Liability	107,833,399	112,650,825
3. Ratio [(1) / (2)]	54.2%	54.3%

A high percentage of liability concentrated in retirees indicates a mature plan. An increasing percentage may indicate a need for less risky and / or more liquid asset allocation which may lead to increased investment risk, a need to lower the long-term return on asset assumption, and increased costs.

**Exhibit VIII: ASOP 51 Disclosures (continued)**

Ratio of Cash Flow to Assets (Pension Only)	June 30, 2020 (000)	June 30, 2021 (000)
1. Total Contributions	5,744,370	5,839,890
2. Benefit Payments	6,876,515	7,134,332
3. Cash Flow [(1) – (2)]	(1,132,145)	(1,294,442)
4. Market Value of Assets	58,566,786	71,967,352
5. Ratio [(3) / (4)]	(1.9%)	(1.8%)

When this cash flow ratio is negative more cash is being paid out than deposited in the Retirement System fund. Negative cash flow means the fund needs to rely on investment returns to cover benefit payments and at the same time may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not garner the same returns as less liquid assets and therefore increase the investment risk. However, the low magnitude of the ratio implies there may already be enough liquid assets to cover the benefit payments, less investment return is needed to cover the shortfall, or only a small portion of assets will need to be converted to cash. Therefore, the investment risk is likely not amplified at this time. This maturity measure should be monitored for continual negative trend with greater magnitude.

Contribution Volatility (Pension Only)	June 30, 2020 (000)	June 30, 2021 (000)
1. Market Value of Assets	58,566,786	71,967,352
2. Payroll	13,974,295	14,057,526
3. Asset Volatility Ratio (AVR) [(1) / (2)]	4.2	5.1
4. Accrued Liability	107,833,399	112,650,825
5. Liability Volatility Ratio (LVR) [(4) / (2)]	7.7	8.0

Plans that have higher asset-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 10 may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 5. Plans that have higher liability-to-payroll ratios experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, if an assumption change increases the liability of two plans by the same percent the plan with a liability-to-payroll ratio of 10 may experience twice the contribution volatility than a plan with a liability-to-payroll ratio of 5.

## Exhibit IX

### Glossary

<b>Accrued Liability</b>	The difference between (a) the present value of future plan benefits, and (b) the present value of future normal cost. It is the portion of the present value of future plan benefits attributable to service accrued as of the valuation date. Sometimes referred to as “actuarial accrued liability”.
<b>Accrued Service</b>	The service credited under the plan that was rendered before the date of the actuarial valuation.
<b>Actuarial Assumptions</b>	Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.
<b>Actuarial Cost Method</b>	A mathematical budgeting procedure for allocating the dollar amount of the “present value of future plan benefits” between the present value of future normal cost and the accrued liability. Sometimes referred to as the “actuarial funding method”.
<b>Actuarial Equivalent</b>	A series of payments is called an actuarial equivalent of another series of payments if the two series have the same actuarial present value.
<b>Actuarial Value of Assets</b>	The value of current plan assets recognized for valuation purposes. Based on a smoothed market value that recognizes investment gains and losses over a period of ten years.
<b>Amortization</b>	Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.
<b>Experience Gain (Loss)</b>	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, in accordance with the actuarial cost method being used.
<b>Normal Cost</b>	The annual cost assumed, under the actuarial funding method, for current and subsequent plan years. Sometimes referred to as “current service cost”.
<b>Present Value</b>	The amount of funds presently required to provide a payment or series of payments in the future. The present value is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.
<b>Unfunded Accrued Liability</b>	The difference between the actuarial accrued liability and actuarial value of assets.