

# Teachers' Retirement System of the State of Illinois

## Actuarial Valuation and Review of Pension Benefits as of June 30, 2020

January 11, 2021

*This report has been prepared at the request of the Board of Trustees to assist in administering the System. This valuation report may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.*



January 11, 2021

Board of Trustees  
Teachers' Retirement System of the State of Illinois  
2815 West Washington Street  
Springfield, Illinois 62702

Dear Board Members:

This report presents the results of the annual valuation of the assets and liabilities of the Teachers' Retirement System of the State of Illinois (TRS or System) as of June 30, 2020, prepared in accordance with the funding policy specified under the Illinois Pension Code (40 ILCS 5/16). This valuation takes into account all of the pension benefits to which members are entitled.

### **Actuarial Assumptions and Methods**

The valuation was based on the actuarial assumptions adopted by the Board of Trustees, reflecting the three-year demographic and economic experience review covering the period July 1, 2014, through June 30, 2017, presented at the August 2018 Board meeting, and the economic experience review presented at the August 2016 Board meeting. The economic assumptions were last reviewed in June 2020, but no changes were adopted. In our opinion, the actuarial assumptions as approved by the Board are reasonably related to the experience of and the expectations for the System. The actuarial assumptions and methods used for funding purposes meet the parameters set by Actuarial Standards of Practice. The methods mandated by the Illinois Pension Code as described in the Funding Adequacy section are inadequate to appropriately fund TRS.

### **Assets and Membership Data**

TRS reported to the actuary the individual data for members of the System as of the prior valuation date. Valuation results are projected, based upon the actuarial assumptions, to account for the one-year difference between the date of the census data and the valuation date. The impact on the valuation due to the census data that lags one year behind the valuation date has been studied and deemed immaterial. The amount of assets in the trust fund as of the valuation date was based on statements prepared by TRS.

## Funding Adequacy

The member and employer contribution rates are determined in accordance with the funding policy specified under the Illinois Pension Code (40 ILCS 5/16). The member contribution rate is 9.0%, which is comprised of 7.5% toward the cost of the retirement annuity, 0.5% toward the cost of the automatic annual increase in the retirement annuity, and 1.0% for survivor benefits. The employer contributions are determined such that, together with the member contributions, the plan is projected to achieve 90% funding by 2045. The 2045 funding objective of 90% was set in 1994 as a 50-year objective. TRS members have always contributed their share. **The State funding has been inadequate, resulting in TRS being among the worst funded public employee retirement systems in the United States. We strongly recommend an actuarial funding method that targets 100% funding. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability, and the principal balance.** The funding policy adopted by the Board, referred to as the Board-Adopted Actuarial Funding Policy, meets this standard.

The valuation indicates that for the fiscal year ended June 30, 2020, the actuarial experience of TRS was unfavorable, generating a net actuarial loss of \$1.0 billion (0.8% of the actuarial accrued liability). This loss is the net result of a \$970 million loss due to unfavorable investment return experience and a \$50 million net loss due to demographic experience for fiscal 2020.

It is important to note that this actuarial valuation is based on plan assets as of June 30, 2020. Due to the COVID-19 pandemic, market conditions have changed significantly since the valuation date. TRS' actuarial funded status does not reflect short term fluctuations of the market, but rather is based on the fair values on the last day of the plan year. While it is impossible to determine how the market will perform over the next several months, and how that will affect the results of next year's valuation, Segal is available to prepare projections of potential outcomes upon request.

Segal valuation results are based on proprietary actuarial modeling software. The actuarial valuation models generate a comprehensive set of liability and cost calculations that are presented to meet regulatory, legislative, and client requirements. Deterministic cost projections are based on our proprietary forecasting model. Our Actuarial Technology and Systems unit, comprised of both actuaries and programmers, is responsible for the initial development and maintenance of these models. The models have a modular structure that allows for a high degree of accuracy, flexibility, and user control. The client team programs the assumptions and the plan provisions, validates the models, and reviews test lives and results, under the supervision of the responsible actuaries.

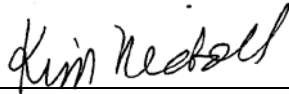
### Actuarial Certification

In preparing the results presented in this report, we have relied upon information TRS staff provided to us regarding the benefit provisions, System members, benefit payments and unaudited plan assets. While the scope of our engagement did not call for us to perform an audit or independent verification of this information, we have reviewed this information for reasonableness. The accuracy of the results presented in this report is dependent upon the accuracy and completeness of the underlying information.

In our opinion, the results presented comply with the Illinois Pension Code and, where applicable, the Internal Revenue Code, and the Statements of the Governmental Accounting Standards Board. While all calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board, this does not endorse the funding methodology required by the Illinois Pension Code. The undersigned are independent actuaries. They are Fellows of the Society of Actuaries, Enrolled Actuaries, and Members of the American Academy of Actuaries, and are experienced in performing valuations for large public retirement systems. They meet the Qualification Standards of the American Academy of Actuaries.

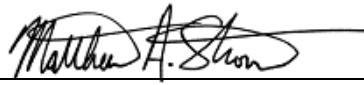
Respectfully submitted,

Segal



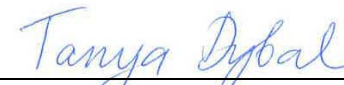
---

Kim M. Nicholl, FSA, FCA, MAAA, EA  
Senior Vice President and Actuary



---

Matthew A. Strom, FSA, MAAA, EA  
Senior Vice President and Actuary



---

Tanya Dybal, FSA, MAAA, EA  
Consulting Actuary

# Table of Contents

## Section 1: Valuation Summary

Overview of TRS .....	8
Purpose of the Annual Actuarial Valuation .....	8
Significant Results of the Actuarial Valuation .....	9
Summary of Key Valuation Results .....	11
Significant Issues Facing TRS .....	13
Sensitivity Projections .....	21
Important Information about Actuarial Valuations .....	23

## Section 2: Actuarial Valuation Results

A. Membership Data .....	25
B. Financial Information .....	29
C. Actuarial Experience .....	33
D. Development of Employer Costs .....	38
E. Risk .....	40

## Section 3: Supplemental Information

Exhibit A – Summary of Membership Data .....	42
Exhibit B – Active Membership Data as of June 30, 2019 used in June 30, 2020 Actuarial Valuation (Number and Average Annual Salary) .....	45
Exhibit C – 10-Year History of Active Membership Data .....	46
Exhibit D – History of Active Membership Data .....	47
Exhibit E – 10-Year History of Annuitant and Survivor Annuitant Membership .....	48
Exhibit F – Benefit Stream for Guaranteed Minimum Annuity Reserve .....	49
Exhibit G – Reconciliation of Membership Data .....	50
Exhibit H – Summary Statement of Income and Expenses on a Fair Value Basis .....	51

# Table of Contents

Exhibit I – Summary Statement of System Assets .....	52
Exhibit J – History of System Revenue and Expenses.....	53
Exhibit K – Development of Unfunded Actuarial Accrued Liability .....	54
Section 4: Reporting Information	
Exhibit I – Derivation of Employer Contributions under Illinois Pension Code .....	55
Exhibit II – Development of Statutory State Contribution under Illinois Pension Code.....	58
Exhibit III – Development of State Contribution Based on Board-Adopted Actuarial Funding Policy .....	60
Exhibit IV – Components of Unfunded Liability Bases and Amortization Payment under Board-Adopted Actuarial Funding Policy .....	61
Exhibit V – Components of Phase-in of the Effect of Assumption Changes .....	62
Exhibit VI – 10-Year History of Unfunded Actuarial Liability and Funded Ratio .....	63
Exhibit VII – Funded Ratio .....	64
Exhibit VIII – Department of Insurance Information.....	65
Exhibit IX – Roll Forward of Actuarial Accrued Liability and Normal Cost.....	66
Exhibit X – State’s Share of the Contribution to TRS Necessary to Fund Normal Cost Plus Interest on the Unfunded Actuarial Accrued Liability (UAAL) .....	67
Exhibit XI – Development of Actuarial Determined Contribution (ADC).....	68
Section 5: Projections	
Overview .....	69
Table 1 – Projection of Funded Ratio to 2046.....	70
Table 2 – Projection of Contributions to Trust to 2046 (Dollars).....	72
Table 3 – Projection of Contributions to Trust to 2046 (Percent of Payroll) .....	75
Table 4 – Projection of Employer Normal Cost and Amortization Amount to 2046 .....	78
Table 5 – Projection of Funded Ratio to 2046 by Tier .....	82
Table 6 – Projection of Actuarial Accrued Liability to 2046 by Member Group .....	87
Table 7 – Projection of Total Normal Cost to 2046 by Member Group .....	88
Table 8 – Projection of Benefit Payments to 2046 by Member Group .....	89

# Table of Contents

Table 9 – Projection of Payroll to 2046 by Member Group .....	90
Table 10 – Projection of Member Count to 2046 by Member Group .....	91
Table 11 – Projection of Employer Normal Cost to 2046 by Member Group .....	92
Table 12 – Projection of Debt Service to 2033 .....	93
Section 6: GASB Information	
Exhibit 1 – Schedule of Employer Contributions .....	94
Exhibit 2 – Schedule of Funding Progress .....	96
Exhibit 3 – Solvency Test.....	97
Exhibit 4 – Net Pension Liability.....	98
Exhibit 5 – Schedules of Changes in Net Pension Liability.....	100
Exhibit 6 – Reconciliation of Collective Net Pension Liability.....	101
Exhibit 7 – Collective Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions .....	102
Exhibit 8 – Collective Pension Expense .....	104
Exhibit 9 – Development of Blended Discount Rate .....	105
Exhibit 10 – Assumed Rate of Investment Return.....	111
Section 7: Assumptions, Benefit Provisions, and Definitions	
Summary of Assumptions and Methods.....	112
Summary of Plan Provisions.....	120
Definitions of Terms.....	128
History of Legislative Changes .....	133

# Section 1: Valuation Summary

## Overview of TRS

- The Teachers' Retirement System of the State of Illinois (TRS) was established by the State of Illinois on July 1, 1939, to provide retirement, disability, and death benefits to teachers employed by Illinois public elementary and secondary schools outside the City of Chicago. TRS is the administrator of a cost-sharing, multiple-employer defined benefit public employee retirement system. Membership is mandatory for all full-time, part-time, and substitute public school personnel employed outside of Chicago in positions requiring certification. Persons employed at certain state agencies are also members. TRS is governed by the Illinois Pension Code (40 ILCS 5/16).
- Members of TRS are employed by school districts, special districts, and certain state agencies. As of June 30, 2020, there were 990 employers, comprised of 851 local school districts, 129 special districts, and 10 state agencies. The membership totaled over 429,000 members as of June 30, 2019. Of the 429,000 members, 125,000 are retirees and survivors to whom TRS paid nearly \$7.1 billion during the fiscal year ended June 30, 2020. As of June 30, 2020, the assets of TRS amounted to \$52.3 billion on a fair value basis.
- The amount of the benefit paid to a member upon retirement, termination, disability, or death is defined by the Illinois Pension Code (40 ILCS 5/16). The contributions to fund these benefits are determined through an annual valuation based upon the funding provisions in the Illinois Pension Code (40 ILCS 5/16).

## Purpose of the Annual Actuarial Valuation

An actuarial valuation is performed annually as of June 30. The purposes of the annual actuarial valuation are to:

- Calculate the annual contribution as required by the Illinois Pension Code. This contribution is not adequate to fund TRS.
- Calculate an actuarially determined contribution based upon the funding policy adopted by the Board. This contribution, if paid, would be expected to adequately fund TRS.
- Determine the funding progress under the Illinois Pension Code's inadequate funding standard.
- Determine the annual gain and loss amounts by source.
- Satisfy regulatory and accounting requirements.



## Section 1: Valuation Summary

### Significant Results of the Actuarial Valuation

1. The contribution made during fiscal 2020 by the State, as required by the Illinois Pension Code, was insufficient to reduce the unfunded actuarial accrued liability.
2. This actuarial valuation continues to assume that buyout provisions introduced with Public Act 100-0587 (and amended by Public Act 101-0010) are effective through fiscal year 2022, at which point the total expected buyout amount is expected to reach the assumed \$650 million share apportioned to TRS.
3. The total projected employer contribution for 2022, including State, Federal, and School Districts, is \$5.79 billion. Of this amount, \$1.18 billion, or about 20%, is for the employer portion of the normal cost and \$4.61 billion, or about 80%, is for unfunded actuarial accrued liability. The required State contribution for 2022 is \$5.69 billion, an increase from \$5.14 billion for 2021.
4. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of June 30, 2020, was 40.5%, compared to 40.6% as of June 30, 2019. This ratio is a measure of funded status, and its history is a measure of funding progress.
5. For the year ended June 30, 2020, Segal has estimated that the asset return on a fair value basis was 0.52%. After gradual recognition of previous investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 5.16%. This represents an experience loss when compared to the assumed rate of 7.00%. As of June 30, 2020, the actuarial value of assets (\$54.9 billion) represented 104.9% of the fair value (\$52.3 billion).
6. The investment loss on the actuarial value of assets for the year ended June 30, 2020, was \$970 million. The combined demographic and liability experience resulted in a \$1.0 billion loss (0.8% of actuarial accrued liability), largely due to unfavorable investment experience.
7. As page 30 of this report indicates, the total investment loss not yet recognized as of June 30, 2020, is \$2.6 billion. These unrecognized losses will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent they are not offset by recognition of gains derived from future experience. This means that earning the assumed rate of investment return of 7.00% per year (net of investment expenses) on a fair value basis will result in investment losses on the actuarial value of assets in the next few years.
8. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 104.9% of the fair value of assets as of June 30, 2020. Guidelines in Actuarial Standard of Practice No. 44 (Selection and Use of Asset Valuation Methods for Pension Valuations) recommend that asset values fall within a reasonable range around the corresponding fair value. The actuarial asset method complies with this guideline.
9. The System's cash flow (contributions minus benefit payments, refunds, and expenses) as a percentage of the fair value of assets was -2.3% as of June 30, 2020, compared to -2.5% from the prior year. Negative cash flow drains the assets of the System without investment income and may cause suboptimal investment strategies.

## Section 1: Valuation Summary

### **Significant Results of the Actuarial Valuation** *continued*

10. This actuarial valuation report as of June 30, 2020, is based on financial data as of that date. Changes in the value of assets subsequent to that date are not reflected.
11. The GASB net pension liability (NPL) is equal to the difference between the TPL and the Plan's fiduciary net position. The NPL increased from \$81.1 billion as of June 30, 2019, to \$86.2 billion as of June 30, 2020. This is a result of the contributions required by the Illinois Pension Code being insufficient to reduce the NPL.

## Section 1: Valuation Summary

### Summary of Key Valuation Results

	June 30, 2020	June 30, 2019
<b>Present Value of Future Benefits:</b>		
1. Active members	\$66,164,025,238	\$64,201,943,307
2. Retired members and beneficiaries receiving benefits	88,185,983,215	85,788,805,976
3. Inactive members with deferred benefits	<u>3,493,651,653</u>	<u>3,537,804,681</u>
4. Total: (1) + (2) + (3)	\$157,843,660,106	\$153,528,553,964
<b>Actuarial Accrued Liability:</b>		
1. Active members	\$43,918,912,145	\$42,130,358,296
2. Retired members and beneficiaries receiving benefits	88,185,983,215	85,788,805,976
3. Inactive members with deferred benefits	<u>3,493,651,653</u>	<u>3,537,804,681</u>
4. Total: (1) + (2) + (3)	\$135,598,547,013	\$131,456,968,953
<b>Funded Status:</b>		
1. Actuarial accrued liability	\$135,598,547,013	\$131,456,968,953
2. Actuarial value of assets (AVA)	<u>54,890,975,828</u>	<u>53,391,192,733</u>
3. Unfunded actuarial accrued liability (AVA basis): (1) – (2)	\$80,707,571,185	\$78,065,776,220
4. Funded ratio (AVA basis): (2) / (1)	40.5%	40.6%
5. Fair value of assets (FVA)	\$52,316,477,771	\$53,262,789,367
6. Unfunded actuarial accrued liability (FVA basis): (1) – (5)	83,282,069,242	78,194,179,586
7. Funded ratio (FVA basis): (5) / (1)	38.6%	40.5%
<b>Summary of State Contributions for Fiscal Year:</b>		
	<b>2022</b>	<b>2021</b>
1. Based on Statutory Funding Plan	\$5,694,106,973	\$5,140,736,721
2. Based on Board-Adopted Actuarial Funding Policy	8,850,455,308	8,344,196,301
3. Difference between Board-Adopted Actuarial Funding Policy and Statutory Funding: (2) – (1)	\$3,156,348,335	\$3,203,459,580
4. Normal cost rate based on Statutory Funding Plan		
(a) Total (including administrative expenses)	19.31%	19.41%
(b) Member rate	<u>9.00%</u>	<u>9.00%</u>
(c) Employer: (4a) – (4b)	10.31%	10.41%

## Section 1: Valuation Summary

### Summary of Key Valuation Results *continued*

	June 30, 2020	June 30, 2019
<b>Summary of State Contributions for Fiscal Year (continued):</b>	<b>2022</b>	<b>2021</b>
5. Total normal cost based on Statutory Funding Plan		
(a) Total	\$2,174,576,470	\$2,145,060,808
(b) Administrative expenses	40,892,235	31,439,548
(c) Expected member contributions	<u>1,032,339,073</u>	<u>1,009,317,615</u>
(d) Total employer normal cost: (5a) + (5b) – (5c)	\$1,183,129,632	\$1,167,182,741
<b>GASB Information:</b>		
1. Long-term expected rate of return	7.00%	7.00%
2. Municipal bond index*	2.21%	3.50%
3. Single equivalent discount rate	7.00%	7.00%
4. Total pension liability	\$138,531,733,887	\$134,370,954,628
5. Plan fiduciary net position	<u>52,316,477,771</u>	<u>53,262,789,367</u>
6. Net pension liability: (4) – (5)	\$86,215,256,116	\$81,108,165,261
7. Plan fiduciary net position as a percentage of total pension liability: (5) / (4)	37.8%	39.6%
<b>Demographic data used for valuation as of June 30**:</b>	<b>2019</b>	<b>2018</b>
1. Number of active members		
(a) Full-time and regular part-time	135,752	134,160
(b) Substitute, part-time, and hourly paid	<u>27,323</u>	<u>26,592</u>
(c) Total	163,075	160,752
2. Number of inactive members		
(a) Eligible for deferred annuities	19,363	19,726
(b) Eligible for refunds or single sum benefits only	121,908	119,833
3. Number of annuitants	<u>124,791</u>	<u>122,895</u>
4. Total membership: (1c) + (2a) + (2b) + (3)	429,137	423,206
5. Annual salaries		
(a) Full-time and regular part-time	\$10,120,309,474	\$9,807,965,387
(b) Substitute, part-time, and hourly paid	<u>163,335,209</u>	<u>154,944,377</u>
(c) Total	\$10,283,644,683	\$9,962,909,764
6. Annual Annuities	\$6,927,481,534	\$6,639,967,327

\* Bond Buyer's 20-Bond GO index.

\*\* Member data used in the valuation is as of the prior valuation date.

## Section 1: Valuation Summary

### Significant Issues Facing TRS

#### Funding Policy

A funding policy outlines the parameters for calculating an actuarially determined contribution rate and ensures the systematic funding of future benefit payments. An actuarially determined contribution is comprised of the Normal Cost and an amortization of the Unfunded Actuarial Accrued Liability. These amounts are determined by the following three funding policy components:

- *Actuarial Cost Method*: The Actuarial Cost Method allocates the total present value of future benefits to each year (Normal Cost) including all past years (Actuarial Accrued Liability or AAL)
- *Asset Smoothing Method*: The techniques that spread the recognition of investment gains or losses over a period of time for the purposes of determining the Actuarial Value of Assets used in the actuarial valuation
- *Amortization Policy*: The method on how, in terms of duration and pattern, to fund the Unfunded Actuarial Accrued Liability, or UAAL

#### Historical Underfunding by the State

The Illinois Pension Code sets the parameters for funding TRS. The employer contributions are determined such that, together with the member contributions, the System is projected to achieve 90% funded by 2045. The 2045 funding objective of 90% was set in 1994 as a 50-year objective. TRS members have always contributed their share. **The State funding has been inadequate, resulting in TRS being among the worst funded public employee retirement systems in the United States.**

The State has historically underfunded TRS by the use of funding policies that do not provide for adequate funding of TRS and include:

- Establishing a 50-year period in 1994, over which to amortize the Unfunded Actuarial Accrued Liability
- Back loading the 50-year period by requiring a 15-year period to ramp up to full contributions as determined under the Illinois funding policy
- Setting a funding target of 90% of the actuarial accrued liability (as opposed to 100%)
- Requiring the use of the projected unit credit cost method, which further back loads the contributions to TRS as compared to the entry age normal cost method, which is a level cost funding method
- Imposing a maximum contribution based upon Pension Obligation Bond (POB) debt payments despite the fact that not all of the POB proceeds were contributed to TRS

## Section 1: Valuation Summary

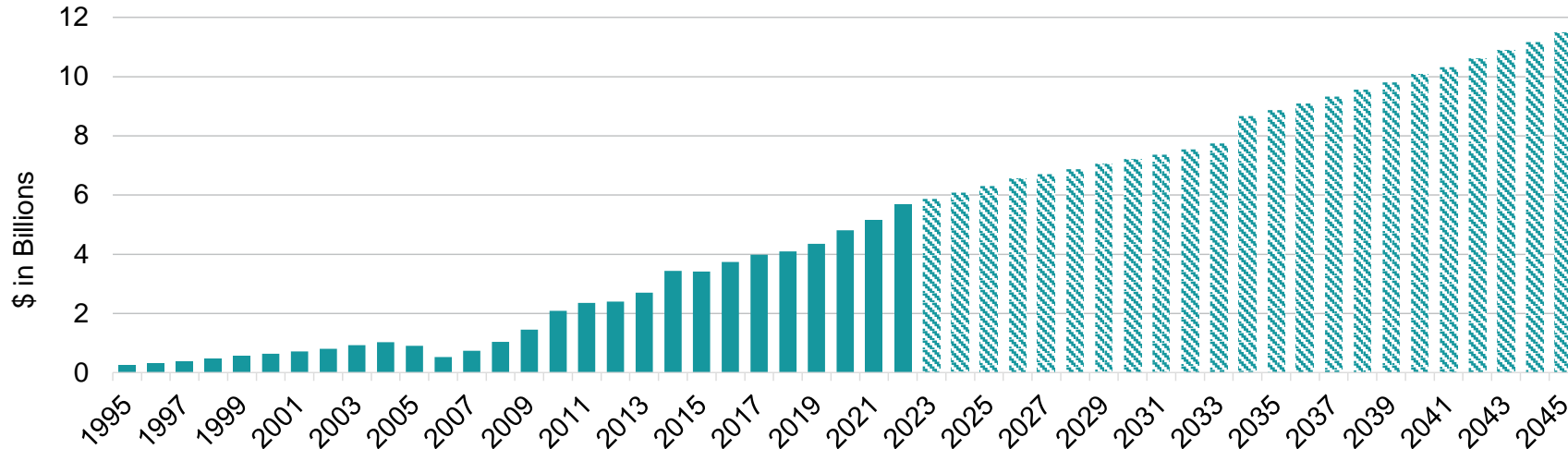
### Significant Issues Facing TRS *continued*

#### Historical Underfunding by the State *continued*

- Reducing contributions for fiscal years ended June 30, 2006 and 2007
- Modifying the asset valuation method to reduce contributions for the fiscal year ended June 30, 2011; further reducing FY 2011 contributions by requiring TRS to recertify the 2009 valuation to assume that Tier II had been in effect in 2009
- Requiring Tier II benefit provisions for members to be hired in the future be reflected in the determination of the contribution, resulting in reduced and back-loaded contributions
- Reducing contributions by phasing in the effect of increased liabilities as a result of assumption changes

The graph below shows a history and projection of the State required contributions under the Illinois Pension Code. The graph illustrates the effect of inadequate State contributions on projected future contributions.

State Required Contribution for Fiscal Year Ending June 30



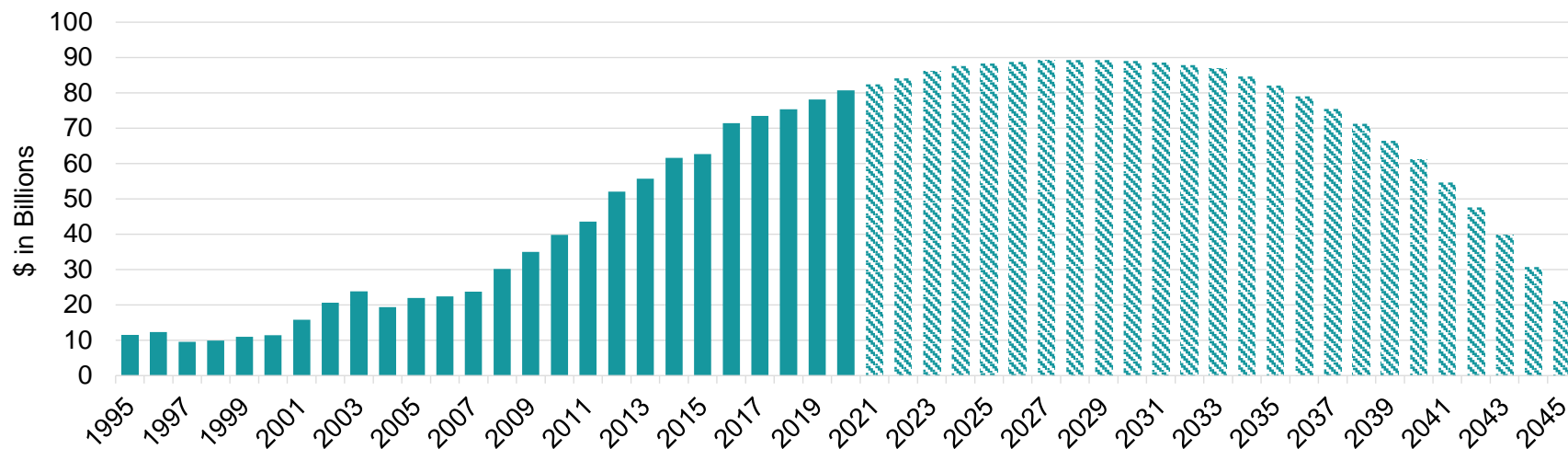
## Section 1: Valuation Summary

### Significant Issues Facing TRS *continued*

#### Historical Underfunding by the State *continued*

The insufficiency of the State contributions is the primary reason for the historical and projected increases in UAAL as shown in the graph below.

Unfunded Actuarial Accrued Liability as of Fiscal Year Ending June 30



#### Funding Policy Certified by the Board

Because State contributions under the Illinois Pension Code are inadequate, the Board of Trustees adopted a funding policy (“Board-Adopted Actuarial Funding Policy”), comprised of the following components:

- *Actuarial Cost Method:* The entry age normal method, which allocates costs evenly as a level percentage of salary
- *Asset Smoothing Method:* The actuarial value of assets is based on the fair value of assets with a five-year phase-in of investment returns in excess of (or less than) expected investment income

## Section 1: Valuation Summary

### Significant Issues Facing TRS *continued*

#### Funding Policy Certified by the Board *continued*

- *Amortization Policy:* The amortization policy is a layered amortization approach. Effective with the June 30, 2015, actuarial valuation, the UAAL is amortized over a closed 20-year period. Sources of UAAL that emerge in subsequent valuations are amortized over closed 20-year periods. The amortization payment increases at the expected rate of future State revenue growth (assumed to be 2.0%, which is conservative but reasonable compared to shorter-term projections of State revenue growth). The minimum contribution is the normal cost.

The Board of Trustees prepares an annual certification, which includes State contributions under the Illinois Pension Code and the Board-Adopted Actuarial Funding Policy. Unlike the current funding policy, the Board-Adopted Actuarial Funding Policy would bring TRS to full funding by decreasing the UAAL every year. **We strongly recommend an actuarial funding method that targets 100% funding where payments ultimately cover interest on the unfunded actuarial accrued liability and a portion of the principal balance.** The funding policy adopted by the Board, referred to as the Board-Adopted Actuarial Funding Policy, meets this standard.

#### Implications of Tier II

##### *Lower Benefit Structure/Same Contribution Rate as Tier I*

- Tier II members are those who first established membership with TRS or a reciprocal system after December 31, 2010. While Tier II member contribution rates are the same as Tier I member contribution rates, the value of Tier II benefits is lower than Tier I benefits. This is because Tier II members have to work longer to be eligible for retirement, the final average salary period is longer, pensionable salaries are capped, and the cost-of-living adjustments (COLAs) are smaller.
- The Tier II wage cap, which applies to benefits and contributions, was established in 2011 at \$106,800. The wage cap increases each fiscal year by the lesser of 3% or one-half of the CPI-U as of the preceding September. For the fiscal year ended June 30, 2020, the limit is \$115,929. Based upon the current actuarial assumptions, it is projected that the wage cap will affect the majority of full career Tier II members' final average salary.



## Section 1: Valuation Summary

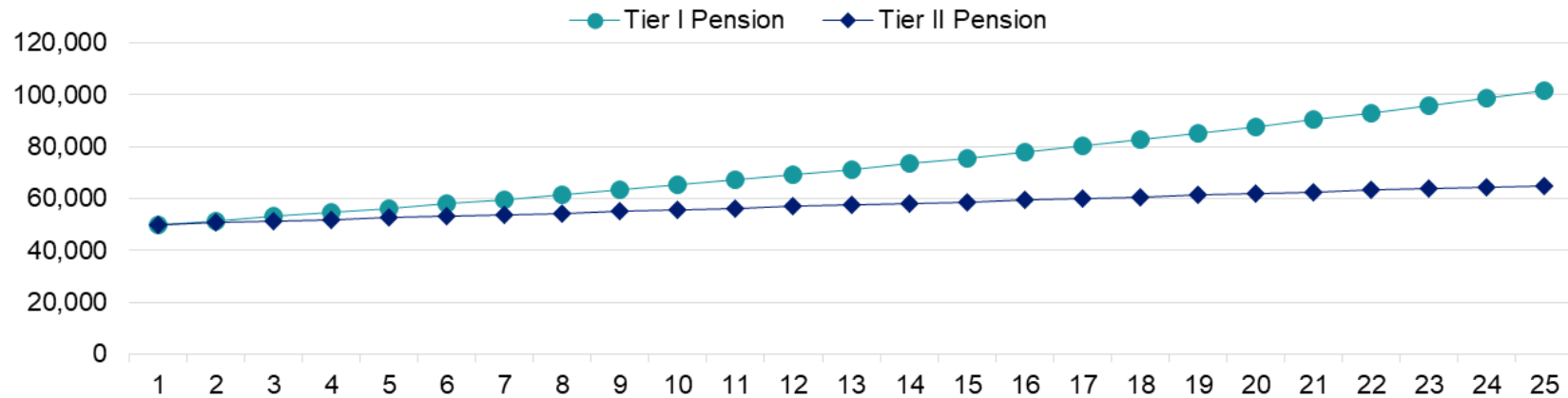
### Significant Issues Facing TRS *continued*

#### Implications of Tier II *continued*

##### Cost-of-living Adjustment

- The Tier II cost-of-living adjustment (COLA) is calculated using the lesser of 3% or one-half of CPI-U as of the preceding September, of the originally granted retirement annuity as compared to the Tier I COLA, which is a 3% compound COLA. The Tier II COLA will not keep pace with inflation, eroding the purchasing power of Tier II pensions during retirement. The chart below shows the comparison of a \$50,000 pension under the Tier I and Tier II COLA provisions.

Illustration of Tier I and II COLA Based on Initial Annual Benefit of \$50,000



## Section 1: Valuation Summary

### Significant Issues Facing TRS *continued*

#### Implications of Tier II *continued*

##### *Total Normal Cost Rate Compared to Member Contribution Rate*

- The following chart compares the Tier I and Tier II member contribution rates to the normal cost rates for fiscal year 2022 using the projected unit credit cost method, as required by the Illinois Pension Code. The normal cost rate is the cost of benefits that accrue during the year expressed as a percentage of payroll, based on the actuarial assumptions. Currently, the total normal cost for Tier I is approximately three times the normal cost rate for Tier II, reflecting the differences in the benefits, as well as the relative age composition of the older, closed Tier I population compared to the younger, ongoing Tier II group. The Tier II total normal cost rate is currently less than the member contribution rate. As a result, based upon the actuarial assumptions, Tier II members are funding their pension benefit and paying a portion of the interest on the UAAL.

#### Allocation of Member Contribution Rate

	For Fiscal Year 2022		
	Tier I	Tier II	Total
1. Total normal cost rate, including administrative expenses	22.99%	7.71%	19.31%
2. Less: member contribution rate	<u>(9.00%)</u>	<u>(9.00%)</u>	<u>(9.00%)</u>
3. Employer normal cost rate	13.99%	(1.29%)	10.31%
4. Allocation of member contribution rate			
a. Normal cost rate	9.00%	7.71%	9.00%
b. Unfunded actuarial accrued liability	<u>0.00%</u>	<u>1.29%</u>	<u>0.00%</u>
c. Total	9.00%	9.00%	9.00%

## Section 1: Valuation Summary

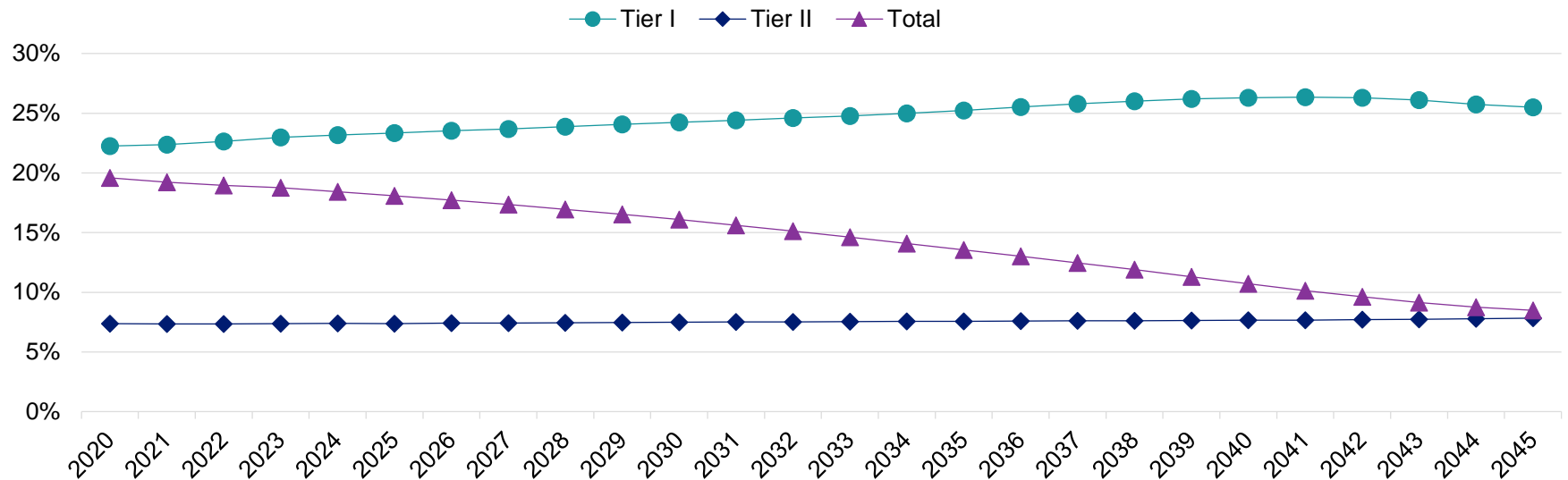
### Significant Issues Facing TRS *continued*

#### Implications of Tier II *continued*

##### Projection of Total Normal Cost Rate by Tier

- The following graph shows a projection of the total normal cost rates for Tier I, Tier II, and in total. The chart shows that the total normal cost rate will decline over time as the Tier I members terminate and retire and are replaced by Tier II members. The funding policy under the Illinois Pension Code, which targets a 90% funded ratio by 2045, requires the funding and benefit provisions for future Tier II members to be reflected in the determination of the contribution. The contributions, as determined by the Illinois Pension Code, are based on a projection of normal cost and actuarial accrued liability for Tier II members who will be hired after the valuation date and through 2045. This results in a deferral of contributions to later years.

Projection of Total Normal Cost Rate for Fiscal Year Ending June 30



## Section 1: Valuation Summary

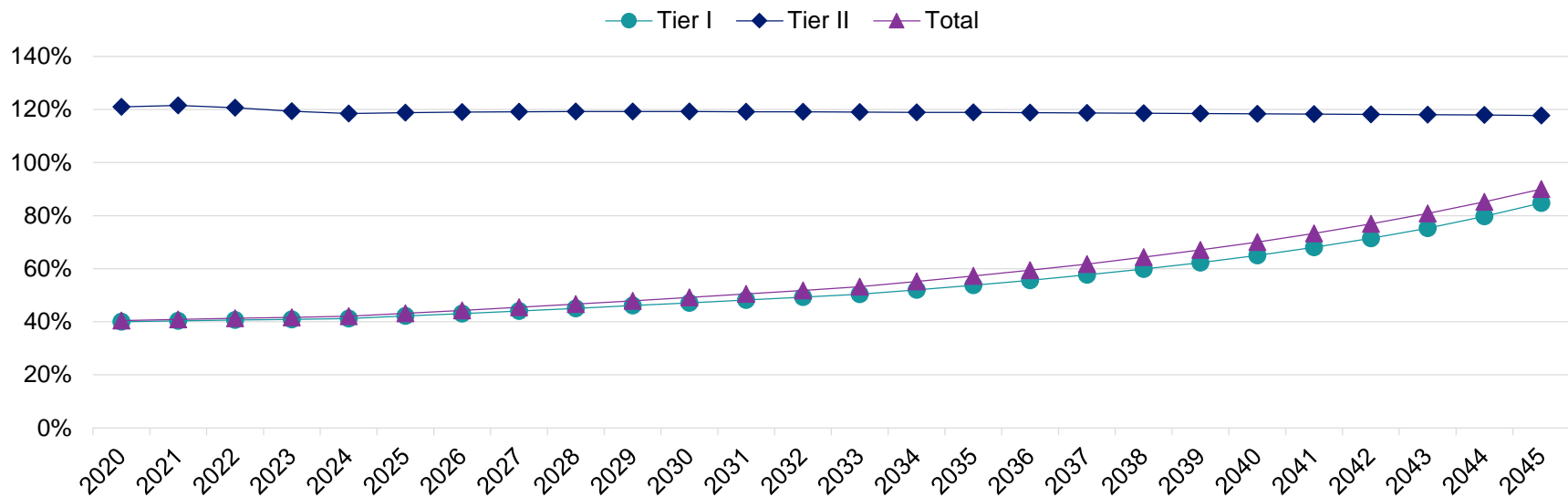
### Significant Issues Facing TRS *continued*

#### Implications of Tier II *continued*

##### *Tier II Contribution toward Unfunded Actuarial Accrued Liability*

- As described above, Tier II members are funding a portion of the interest on the UAAL along with the normal cost of their benefits. Tier I and Tier II liabilities and assets are not allocated separately for purposes of determining the funded ratio and contribution requirements. However, if the assets and liabilities were allocated separately, a projection of the funded ratio for each tier would show that the Tier II funded ratio is 121% as of June 30, 2020, decreasing over time to a funded ratio of 118% as of June 30, 2045. In contrast, the Tier I funded ratio is 40% as of June 30, 2020, increasing to 85% as of June 30, 2045. For the total System, the funded ratio is 41% as of June 30, 2020, increasing to 90% as of June 30, 2045. Tier II member contributions assist in increasing the total funded ratio to 90% as of 2045. The graph below illustrates this.

Projection of Funded Ratio for Fiscal Year Ending June 30



# Section 1: Valuation Summary

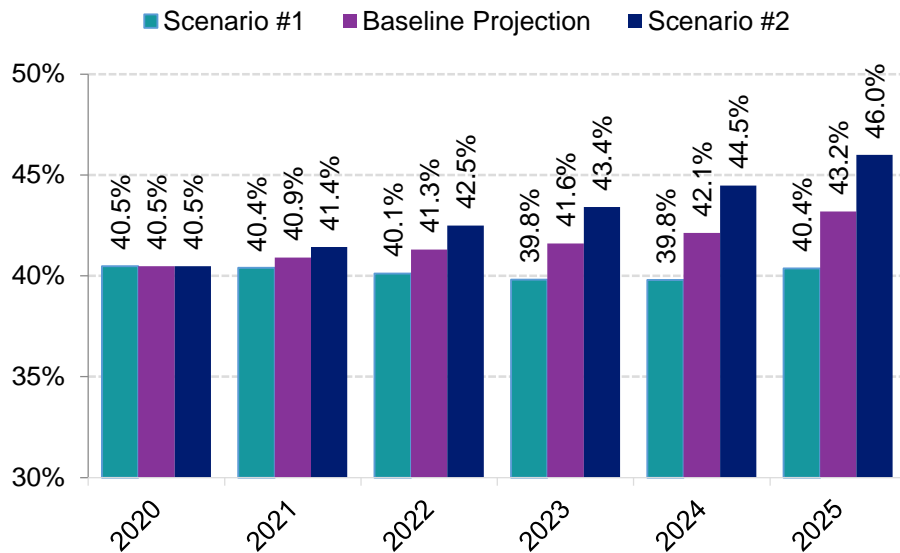
## Sensitivity Projections

The following charts show projections of valuation results under alternative investment return scenarios and their impact on the funded status and State contributions for the next five years. The projections are based on the current actuarial assumptions and assume that all actuarial assumptions are realized, with the exception of the investment return for the year ending June 30, 2021:

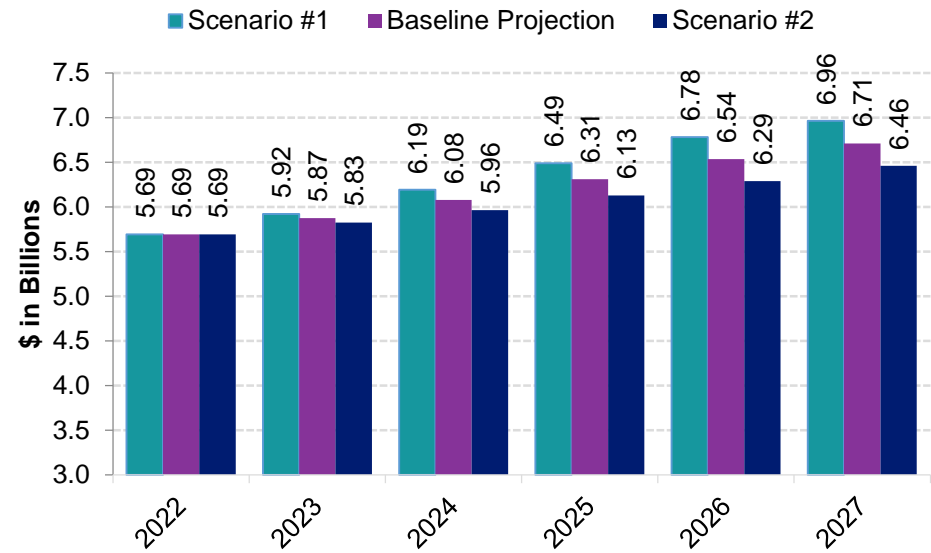
- Scenario 1 assumes a 0% investment return for the year ending June 30, 2021
- Scenario 2 assumes a 14% investment return for the year ending June 30, 2021

Because investment gains and losses are recognized in the actuarial value of assets over a five-year period, the effect on the funded status and State contribution in the first year is small. However, by the fifth year, the investment returns are fully reflected in the valuation. The charts show that investment gains and losses will have a significant effect on the valuation results.

Projection of Funded Ratio for Fiscal Year Ending June 30



Projection of State Contribution for Fiscal Year Ending June 30



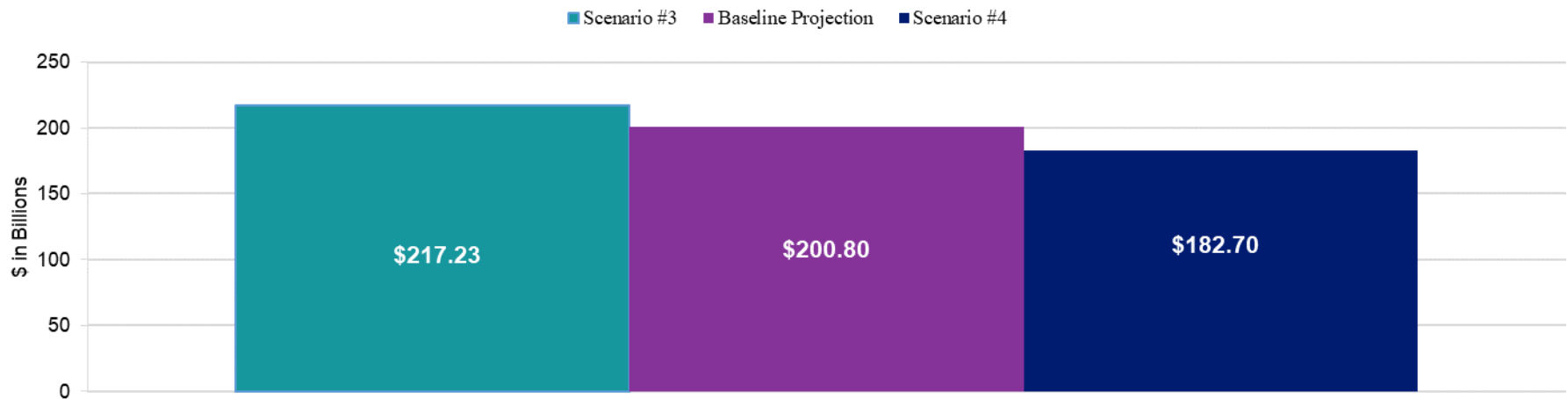
## Section 1: Valuation Summary

### Sensitivity Projections *continued*

The following chart shows the total State contributions for the fiscal years June 30, 2022, through June 30, 2045, based on the current actuarial assumptions and assuming that all actuarial assumptions are realized with the exception of the investment returns as follows:

- Scenario 3 assumes investment returns of 6.00% for each year beginning with the year ending June 30, 2021, through June 30, 2045
- Scenario 4 assumes investment returns of 8.00% for each year beginning with the year ending June 30, 2021, through June 30, 2045

Total State Contribution from Year Ending June 30, 2022 through June 30, 2045



Note that, under the Board-Adopted Actuarial Funding Policy, the total contribution amount paid by the System through fiscal year ending June 30, 2020 would be \$161.25 billion, which would result in an overall savings of \$39.55 billion through June 30, 2045, compared to current Statutory Funding Policy (as shown in the baseline projection scenario above).

## Section 1: Valuation Summary

### Important Information about Actuarial Valuations

An actuarial valuation is a budgeting tool with respect to the financing of future projected obligations of a pension plan. It is an estimated forecast – the actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.

In order to prepare a valuation, Segal relies on a number of input items. These include:

- **Plan of benefits** Plan provisions define the rules that will be used to determine benefit payments, and those rules, or the interpretation of them, may change over time. Even where they appear precise, outside factors may change how they operate. It is important to keep Segal informed with respect to plan provisions and administrative procedures, and to review the plan summary included in our report to confirm that Segal has correctly interpreted the plan of benefits.
- **Participant data** An actuarial valuation for the System is based on data provided to the actuary by TRS. Segal does not audit such data for completeness or accuracy, other than reviewing it for obvious inconsistencies compared to prior data and other information that appears unreasonable. It is important for Segal to receive the best possible data and to be informed about any known incomplete or inaccurate data.
- **Assets** The valuation is based on the fair value of assets as of the valuation date, as provided by TRS, and uses an “actuarial value of assets” that differs from fair value to gradually reflect year-to-year changes in the fair value of assets in determining the contribution requirements.
- **Actuarial assumptions** In preparing an actuarial valuation, Segal projects the benefits to be paid to existing plan participants for the rest of their lives and the lives of their beneficiaries. This projection requires actuarial assumptions as to the probability of death, disability, withdrawal, and retirement of each participant for each year. In addition, the benefits projected to be paid for each of those events in each future year reflect actuarial assumptions as to salary increases. The projected benefits are then discounted to a present value, based on the assumed rate of return that is expected to be achieved on the System’s assets. There is a reasonable range for each assumption used in the projection and the results may vary materially based on which assumptions are selected. It is important for any user of an actuarial valuation to understand this concept. Actuarial assumptions are periodically reviewed to ensure that future valuations reflect emerging plan experience. While future changes in actuarial assumptions may have a significant impact on the reported results, that does not mean that the previous assumptions were unreasonable.

## Section 1: Valuation Summary

### Important Information about Actuarial Valuations *continued*

The user of Segal's actuarial valuation (or other actuarial calculations) should keep the following in mind:

- The actuarial valuation is prepared at the request of the TRS Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the System's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the System will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- If the TRS Board is aware of any event or trend that was not considered in the valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the System's provisions, but they may be subject to alternative interpretations. TRS should look to their other advisors for expertise in these areas.
- The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

As Segal has no discretionary authority with respect to the management or assets of the System, it is not a fiduciary in its capacity as actuaries and consultants with respect to the System.



# Section 2: Actuarial Valuation Results

## A. Membership Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active members, inactive members, retirees and beneficiaries.

This section presents a summary of significant statistical data on these member groups.

Data used for the valuation is as of the prior valuation date. Any changes in liabilities due to demographic experience during the most recent plan year are captured in the subsequent valuation.

More detailed information for this valuation year and the preceding valuation can be found in Section 3, Exhibits A, B, C, D, E, and G.

### Member Population: 2010 – 2019\*

June 30	Full-Time and Regular Part-Time Active Members	Substitutes, Part-Time and Hourly Paid	Inactive Members Eligible for Deferred Annuities	Inactive Members Eligible for Refunds	Annuitants and Survivor Annuitants	Ratio of Full-Time Actives to Annuitants
2010	137,711	32,479	16,266	99,029	101,352	1.36
2011	133,752	32,120	16,811	104,970	105,499	1.27
2012	132,956	29,073	16,995	108,531	106,102	1.25
2013	132,886	28,104	17,250	110,403	109,448	1.21
2014	132,916	26,920	17,575	113,012	112,682	1.18
2015	133,478	26,206	18,362	115,360	115,273	1.16
2016	133,505	26,080	19,038	117,817	117,990	1.13
2017	133,761	26,664	19,531	119,738	120,453	1.11
2018	134,160	26,592	19,726	119,833	122,895	1.09
2019	135,752	27,323	19,363	121,908	124,791	1.09

\* Member data used in the valuation is as of the prior valuation date.

## Section 2: Actuarial Valuation Results

### A. Membership Data *continued*

#### **Active Members**

Plan costs are affected by the age, years of service, and compensation of active members. As of June 30, 2019 (the date as of which census data is collected for the June 30, 2020, valuation), there were 135,752 full-time and regular part-time active members with an average age of 42.2, average years of service of 13.2, and average compensation of \$74,550. The 134,160 full-time and regular part-time active members in the prior valuation had an average age of 42.0, average years of service of 13.1, and average compensation of \$73,106.

In addition, as of June 30, 2019, there were 27,323 active members who were substitutes, part-time, and hourly paid on either a flexible or limited work schedule.

Additional information is shown on the following page.

#### **Inactive Members**

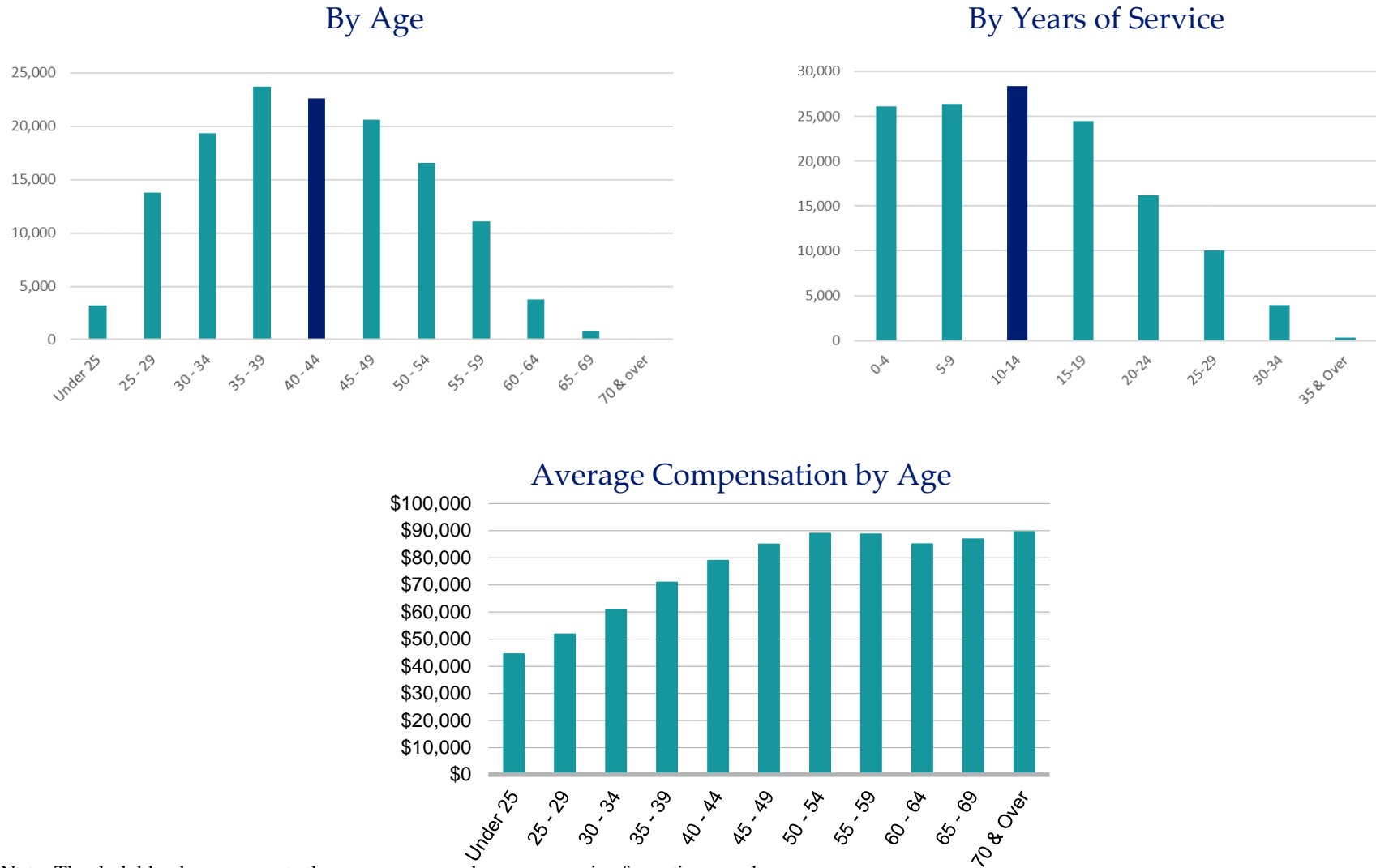
As of June 30, 2019 (the date at which census data is collected for the June 30, 2020, valuation), there were 19,337 participants and 26 survivors with a vested right to a deferred benefit. Inactive members may also be eligible for a refund of their retirement benefit contributions or a single sum benefit.

In addition, there were 121,908 participants entitled to a return of their employee contributions.

## Section 2: Actuarial Valuation Results

### A. Membership Data *continued*

Full-Time and Regular Part-Time Active Participant Data as of June 30, 2019\*



Note: The dark blue bar represents the average age and average service for active members.

\* Member data used for the valuation is as of the prior valuation date

## Section 2: Actuarial Valuation Results

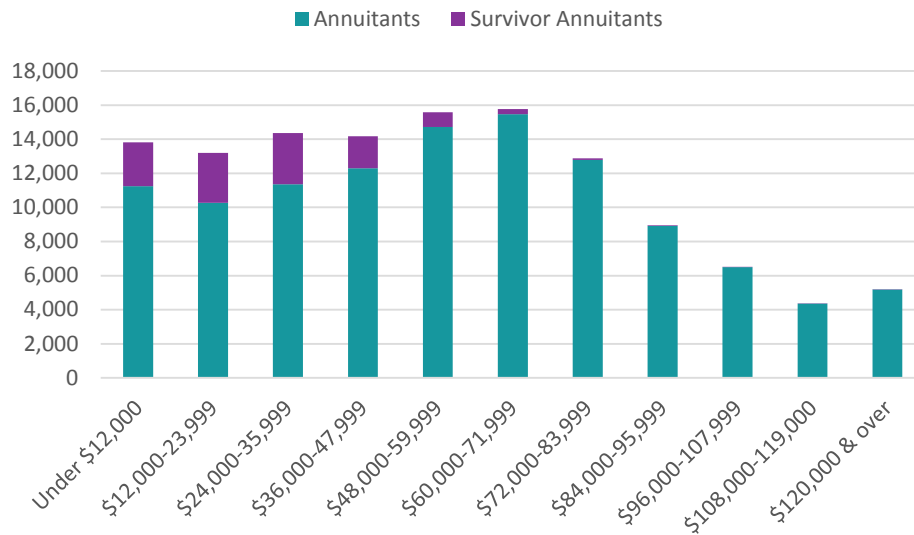
### A. Membership Data *continued*

#### Annuitants and Survivor Annuitants

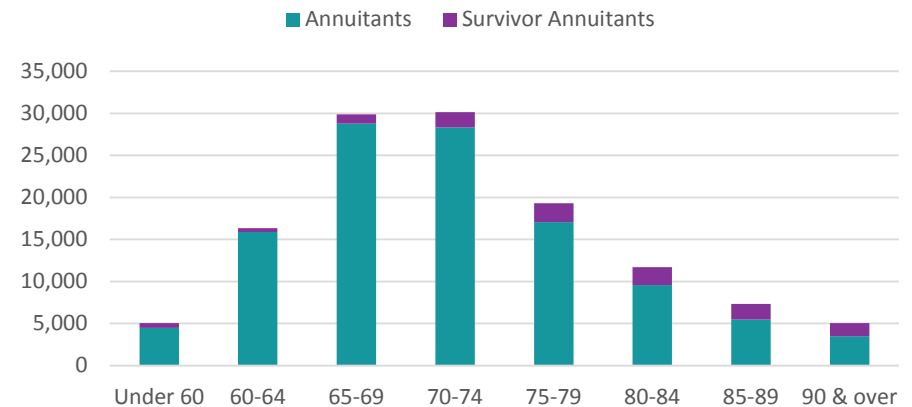
As of June 30, 2019 (the date as of which census data is collected for the June 30, 2020, valuation), 113,116 annuitants and 11,675 survivor annuitants were receiving total annual benefits of \$6,927,481,533. For comparison, in the previous valuation, there were 111,559 annuitants and 11,336 survivor annuitants were receiving total annual benefits of \$6,639,967,327.

#### Distribution of Annuitants and Survivor Annuitants

By Annual Benefit as of June 30, 2019\*



By Age as of June 30, 2019\*



\* Member data used in the valuation is as of the prior valuation date.

## Section 2: Actuarial Valuation Results

### B. Financial Information

Two actuarial values of assets are used for determining the statutory contribution under the Illinois Pension Code, one that includes the Pension Obligation Bond (POB) and one that excludes the POB. The recommended contribution under the Board's funding policy (Board-Adopted Actuarial Funding Policy) includes the POB. The actuarial value of assets used in determining both contributions gradually adjusts to fair value. Under this asset valuation method, the full value of market fluctuations is recognized over a five-year period as opposed to in a single year. The amount of the adjustment to recognize fair value is treated as income, which may be positive or negative.

Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

To determine the employer contributions, the actuarial value of assets are projected one year from the valuation date to the beginning of the contribution fiscal year.

See charts on the following two pages for additional information.

## Section 2: Actuarial Valuation Results

### B. Financial Information *continued*

#### Determination of Actuarial Value of Assets and Projected Actuarial Value of Assets with POB for June 30, 2020 and June 30, 2019 Actuarial Valuations

		2020	2019
1.	Fair value of assets with POB available for benefits	\$52,316,477,771	\$53,262,389,367
2.	Calculation of unrecognized return*		
	<u>Original Amount**</u>	<u>% Not Recognized</u>	<u>% Not Recognized</u>
(a)	Year ended June 30, 2020	80% (\$2,727,965,219)	
(b)	Year ended June 30, 2019	60% (584,445,800)	80% (\$779,261,067)
(c)	Year ended June 30, 2018	40% 257,565,539	60% 386,348,308
(d)	Year ended June 30, 2017	20% 480,347,423	40% 960,694,845
(e)	Year ended June 30, 2016	0	20% (696,585,452)
(f)	Total unrecognized return	(\$2,574,498,057)	(\$128,803,366)
3.	Actuarial value of assets with POB (Current Assets): (1) – (2f)	<u>\$54,890,975,828</u>	<u>\$53,391,192,733</u>
4.	Actuarial value as a percent of fair value: (3) ÷ (1)	<u>104.9%</u>	<u>100.2%</u>
5.	Projected actuarial value of assets		
(a)	Assumed contributions	\$6,247,115,602	\$5,893,184,063
(b)	Assumed distributions	7,476,643,962	7,176,323,805
(c)	Expected return at 7.00%	3,799,334,815	3,692,473,600
(d)	Projected actuarial value of assets: (3) + (5a) – (5b) + (5c)	<u>\$57,460,782,283</u>	<u>\$55,800,526,591</u>

\* Recognition at 20% per year over 5 years

\*\* Total return minus expected return on fair value

## Section 2: Actuarial Valuation Results

### B. Financial Information *continued*

For determining the actuarial value of assets without the POB, the fair value of assets is estimated by adjusting for the POB. The fair value of assets without the POB as of the valuation date is equal to the fair value of assets without the POB as of the prior valuation date, increased by contributions excluding the POB debt service, decreased by disbursements, and credited with interest based upon the investment return of the fair value of assets with the POB.

#### Determination of Actuarial Value of Assets and Projected Actuarial Value of Assets without POB for June 30, 2020 and June 30, 2019 Actuarial Valuations

		2020	2019
1.	Estimated fair value of assets without POB available for benefits	\$47,749,372,530	\$48,321,312,518
2.	Calculation of unrecognized return* <u>Original Amount**</u>	<u>% Not Recognized</u>	<u>% Not Recognized</u>
(a)	Year ended June 30, 2020 (3,102,850,180)	80% (\$2,482,281,744)	
(b)	Year ended June 30, 2019 (881,437,935)	60% (528,862,761)	80% (\$705,150,348)
(c)	Year ended June 30, 2018 579,778,319	40% 231,911,328	60% 347,866,991
(d)	Year ended June 30, 2017 2,152,156,362	20% 430,431,272	40% 860,862,545
(e)	Year ended June 30, 2016 (3,104,582,596)	0	20% (620,916,519)
(f)	Total unrecognized return	(\$2,348,801,905)	(\$117,337,331)
3.	Actuarial value of assets without POB (Current Assets): (1) – (2f)	<u>\$50,098,174,435</u>	<u>\$48,438,649,849</u>
4.	Actuarial value as a percent of fair value: (3) ÷ (1)	<u>104.9%</u>	<u>100.2%</u>
5.	Projected actuarial value of assets		
(a)	Assumed contributions	\$6,669,313,120	\$6,292,382,753
(b)	Assumed distributions	7,476,643,962	7,176,323,805
(c)	Expected return at 7.00%	3,478,615,631	3,359,767,553
(d)	Projected actuarial value of assets: (3) + (5a) – (5b) + (5c)	<u>\$52,769,459,224</u>	<u>\$50,914,476,350</u>

\* Recognition at 20% per year over 5 years

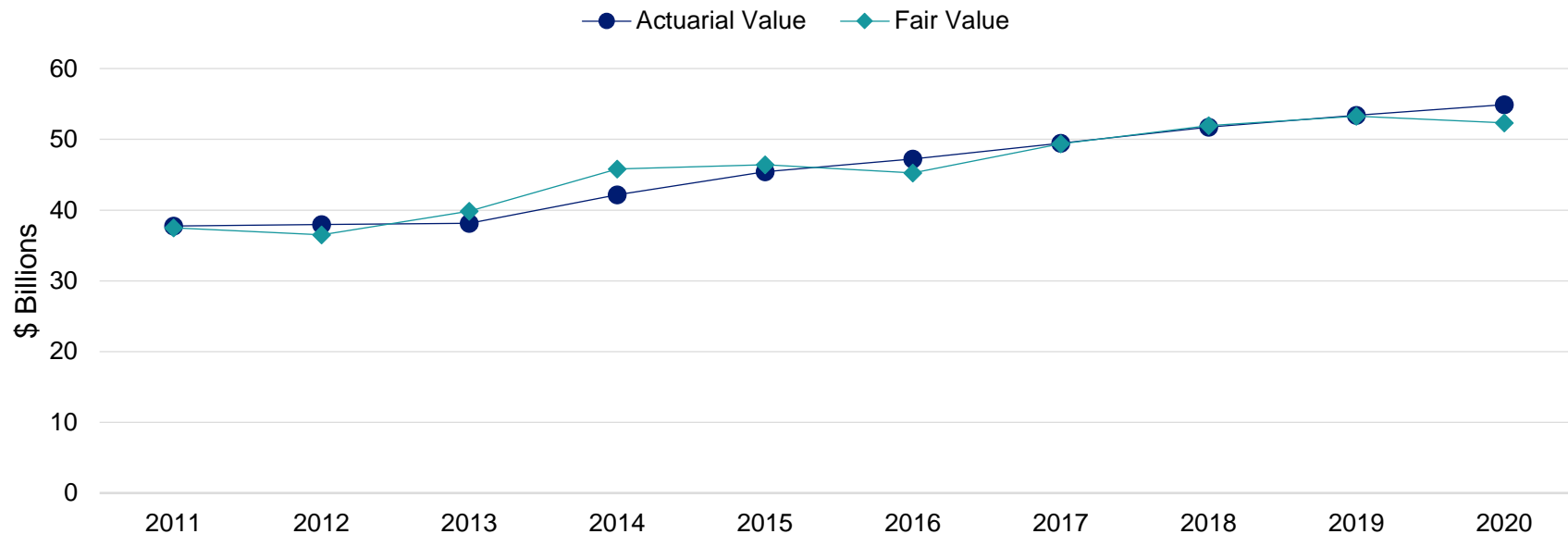
\*\* Total return minus expected return on fair value

## Section 2: Actuarial Valuation Results

### B. Financial Information *continued*

Both the actuarial value and fair value of assets are a representation of the TRS financial status. As investment gains and losses are gradually taken into account, the actuarial value of assets tracks the fair value of assets. The actuarial asset value is significant because TRS liabilities are compared to these assets to determine what portion, if any, remains unfunded. Amortization of the unfunded actuarial accrued liability is an important element in determining the contribution requirement.

Actuarial Value of Assets vs. Fair Value of Assets as of June 30, 2011 – 2020 (with POB)





## Section 2: Actuarial Valuation Results

### C. Actuarial Experience

To calculate the actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. Overall favorable experience relative to the assumptions (an actuarial gain) causes a decrease in the contribution requirement. On the other hand, overall less favorable experience relative to the assumptions (an actuarial loss) causes an increase in the contribution requirement.

Taking account of experience gains or losses in one year without making a change in assumptions reflects the belief that the single years' experience was a short-term development and that, over the long term, experience will return to the original assumptions. For contribution requirements to remain stable, assumptions should approximate experience.

If assumptions are changed, the contribution requirement is adjusted to take into account a change in experience anticipated for all future years.

The total loss is \$1,019,711,060; \$972,850,068 from investment losses and \$46,860,992 in losses from all other sources. The net experience variation from individual sources other than investments was approximately 0.03% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

#### Actuarial Experience for Year Ended June 30, 2020

1.	Net loss from investments*	(\$972,850,068)
2.	Net loss from other experience**	<u>(46,860,992)</u>
3.	Net experience loss: (1) + (2)	(\$1,019,711,060)

\* *Details on page 34*

\*\* *Details in page 37*

## Section 2: Actuarial Valuation Results

### C. Actuarial Experience *continued*

#### Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the TRS investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.0%. The actual rate of return on an actuarial basis for the year ended June 30, 2020, was 5.16%.

Since the actual return for the year was less than the assumed return, TRS experienced an actuarial loss during the fiscal year ended June 30, 2020, with regard to its investments.

#### Investment Experience for Year Ended June 30, 2020

	Fair Value With POB	Fair Value Without POB	Actuarial Value With POB
1. Value of assets as of June 30, 2019	\$53,262,789,367	\$48,321,312,518	\$53,391,192,733
2. Contributions during fiscal year ended June 30, 2020	5,900,510,333	6,299,709,023*	5,900,510,333
3. Benefits and expenses during fiscal year ended June 30, 2020	7,122,491,327	7,122,491,327	7,122,491,327
4. Value of assets as of June 30, 2020	52,316,477,771	47,749,372,530	54,890,975,828
5. Total investment income: (4) – (1) – (2) + (3)	275,669,398	250,842,316	2,721,764,089
6. Average value of assets: (1) + ((2) – (3)) ÷ 2	52,651,798,870	47,909,921,366	52,780,202,236
7. Actual rate of return: (5) ÷ (6)	0.52%	0.52%	5.16%
8. Assumed rate of return	7.00%	7.00%	7.00%
9. Expected return: (6) x (8)	\$3,685,625,922	\$3,353,694,496	\$3,694,614,157
10. Actuarial loss: (5) – (9)	(\$3,409,956,524)	(\$3,102,852,180)	(\$972,850,068)

\* Includes POB debt service

## Section 2: Actuarial Valuation Results

### C. Actuarial Experience *continued*

#### Investment Rate of Return *continued*

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The chart below shows the rate of return on an actuarial basis compared to the market value investment return for the last twenty years, including five-year, ten-year, fifteen-year, and twenty-year averages.

Note that the actuarial value of assets was equal to the fair value of assets prior to June 30, 2009. Effective June 30, 2009, the actuarial value of assets was changed to a method under which market fluctuations in excess of or below the assumed investment return are recognized over a five-year period. The returns were determined by the actuary and may be different from the returns reported in the Comprehensive Annual Financial Report.

#### Investment Return Fair Value vs. Actuarial: 2001 – 2020

Year Ended June 30	Fair Value	Actuarial Value	Year Ended June 30	Fair Value	Actuarial Value
2001	(4.16%)	(4.16%)	2011	23.50%	3.84%
2002	(3.12%)	(3.12%)	2012	0.61%	3.64%
2003	4.78%	4.78%	2013	12.70%	3.83%
2004	16.46%	16.46%	2014	17.19%	12.75%
2005	10.69%	10.69%	2015	3.91%	10.76%
2006	11.98%	11.98%	2016	(0.10%)	6.46%
2007	19.07%	19.07%	2017	12.39%	7.83%
2008	(4.89%)	(4.89%)	2018	8.32%	7.63%
2009	(22.89%)	2.22%	2019	5.10%	5.84%
2010	12.97%	0.71%	2020	0.52%	5.16%
Most recent five-year average return				5.1%	6.6%
Most recent ten-year average return				8.2%	6.8%
Most recent fifteen-year average return				6.1%	6.3%
Most recent twenty-year average return				5.7%	5.9%

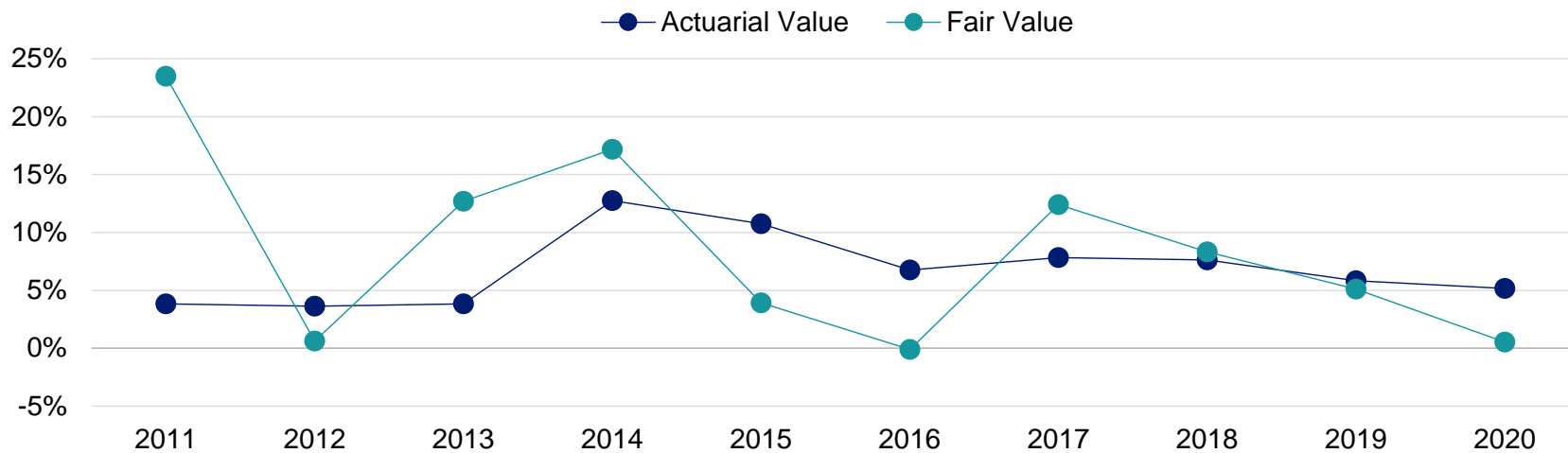
## Section 2: Actuarial Valuation Results

### C. Actuarial Experience *continued*

#### Investment Rate of Return *continued*

The actuarial asset valuation method gradually takes into account fluctuations in the fair value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs. The chart below illustrates the effect that the asset returns on a fair value basis are more volatile than asset returns on an actuarial basis.

Fair Value and Actuarial Rates of Return for Years Ended June 30, 2011 – 2020



## Section 2: Actuarial Valuation Results

### C. Actuarial Experience *continued*

#### Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include but are not limited to:

- salary increases different than assumed,
- retirement experience (earlier or later than expected),
- disability experience different than assumed,
- the extent of turnover among participants,
- mortality (more or fewer deaths than expected), and
- new entrants.

The loss from this other experience for the year ended June 30, 2020, amounted to \$46,860,992, which is approximately 0.03% of the actuarial accrual liability. This is largely due to retirement experience. A five-year history of the demographic gain/(loss) experience is shown in the chart below.

#### Experience Due to Changes in Demographics For Years Ended June 30, 2016 to June 30, 2020

	2020	2019	2018	2017	2016
1. Salary increases	\$41,780,212	\$84,011,865	\$40,293,935	(\$29,518,579)	\$65,504,184
2. Retirement experience	(178,155,930)	(324,388,173)	(341,957,544)	(365,965,251)	(237,492,448)
3. Disability experience	17,701,086	17,840,394	24,275,853	23,361,862	16,091,632
4. Termination experience	(49,417,489)	(60,351,523)	(19,458,838)	(25,597,354)	(15,147,793)
5. Mortality experience	(14,135,952)	(10,977,383)	(42,624,422)	(24,539,086)	(49,779,799)
6. Rehires	(41,266,774)	(39,508,399)	(36,264,543)	(32,789,033)	(23,266,945)
7. New entrants	10,456,950	10,851,490	16,845,581	16,627,360	17,516,646
8. Other	<u>166,176,905</u>	<u>(29,494,007)</u>	<u>(983,112,072)*</u>	<u>(165,896,422)</u>	<u>(737,480,200)**</u>
9. Total	(\$46,860,992)	(\$352,015,736)	(\$1,342,002,050)	(\$604,316,503)	(\$964,054,723)

\* Primarily due to programming enhancements.

\*\*Primarily due to a change in software/actuary, which is within a normal range for this change for a plan the size of TRS.

## Section 2: Actuarial Valuation Results

### D. Development of Employer Costs

#### **Statutory Funding under Illinois Pension Code**

The amount of the employer contribution as determined by the Illinois Pension Code is the amount, which, as a level percentage of member payroll, will result in the System being 90% funded by June 30, 2045. The employer contributions include contributions from the State, School Districts, and Federal Funds. Federal Funds contributions are based on the assumption that 2.00% of total payroll is attributable to Federal Funds payroll. For fiscal 2022, the School Districts' contributions are expected to equal 0.58% of total payroll under Sec. 16-158(e), approximately 0.04% of total payroll under Sec. 16-158(f), and approximately 0.03% of total payroll under Sec. 16-158(i-5). The actuarial cost method is the projected unit credit method.

The methodology for calculating the Federal Funds contribution and, therefore, the State contribution has been changed effective for fiscal years 2021 and thereafter. Based on the modified approach, the Federal Funds contributions are treated in a similar manner as some School District contributions (i.e., a stream of projected contributions estimated as of the valuation date) resulting in the State contribution being the level percent of payroll required to attain 90% funded by fiscal year 2045.

#### **Recommended Funding under Board-Adopted Actuarial Funding Policy**

The actuarially determined contribution under the Board's funding policy, called the Board-Adopted Actuarial Funding Policy, is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability. The amortization of the unfunded accrued liability is a closed 20-year period effective June 30, 2015, and will decline by one year in each subsequent valuation. Sources of unfunded actuarial accrued liability that emerge in subsequent valuations are amortized over closed 20-year periods. Contributions toward the unfunded actuarial accrued liability increase by 2% each year, the estimated increase in future State revenue growth. The actuarial cost method is the entry age normal method. The minimum contribution is the normal cost.

The chart on the following page shows the development of employer contributions under Statutory Funding and the Board-Adopted Actuarial Funding Policy.

## Section 2: Actuarial Valuation Results

### D. Development of Employer Costs *continued*

#### Employer Contributions

	Fiscal Year Ending June 30	
	2022	2021
<b>Based on Statutory Funding Plan</b>		
1. Benefit Trust Reserve:		
a. Employer's cost as percentage of membership payroll	50.29%	47.12%
b. Total employer contribution: (1a) x (8)	\$5,768,670,673	\$5,284,597,987
c. School Districts contributions under Sec. 16-158	(74,211,665)	(74,112,385)
d. Federal Funds contribution	(23,652,035)	(23,348,881)
e. Phase-in of the effect of assumption changes	<u>22,900,000</u>	<u>(46,800,000)</u>
f. State Contribution: (1b) + (1c) + (1d) + (1e)	\$5,693,706,973	\$5,140,336,721
2. Guaranteed Minimum Annuity Reserve	<u>400,000</u>	<u>400,000</u>
3. Total State Contribution: (1f) + (2)	\$5,694,106,973	\$5,140,736,721
<b>Based on Board-Adopted Actuarial Funding Policy (Actuarially Determined Contribution)</b>		
4. Benefit Trust Reserve:		
a. Normal cost plus amortization of UAAL	\$8,947,919,008	\$8,441,257,567
b. School Districts contribution under Sec. 16-158	(74,211,665)	(74,112,385)
c. Federal Funds contribution	<u>(23,652,035)</u>	<u>(23,348,881)</u>
d. State contribution: (4a) + (4b) + (4c)	\$8,850,055,308	\$8,343,796,301
5. Guaranteed Minimum Annuity Reserve	<u>400,000</u>	<u>400,000</u>
6. Total State Contribution: (4d) + (5)	\$8,850,455,308	\$8,344,196,301
<b>Difference Between Board-Adopted Actuarial Funding Policy and Statutory Fund</b>		
7. Shortfall/(Excess): (6) – (3)	\$3,156,348,335	\$3,203,459,580
<b>Expected Membership Payroll</b>		
8. Total membership payroll	\$11,470,434,147	\$11,214,640,162

## Section 2: Actuarial Valuation Results

### E. Risk

Since the actuarial valuation results are dependent on a given set of assumptions and data as of a specific date, there is a risk that emerging results may differ significantly as actual experience differs from the assumptions.

This report does not contain a detailed analysis of the potential range of future measurements, but does include a brief discussion of some risks that may affect the Plan. Upon request, a more detailed assessment of the risks can be provided to enable a better understanding of the risks specific to your Plan. Given the System's current funding level and contribution history, we recommended a detailed risk assessment be performed for TRS.

#### Investment Risk

If the actual return on the fair value of assets for the next Plan Year were 1% different from the assumed (either higher or lower), the projected unfunded actuarial liability would change by 0.6%, or about \$500 million.

Since the Plan's assets are much larger than contributions, investment performance may create significant volatility in contribution requirements. For example, for each 1% difference in return from the assumed return, the Board-Adopted Actuarial Funding Policy contribution would increase or decrease by approximately \$650 million (6.0% of payroll) and the Statutory contribution requirement would increase or decrease by approximately \$500 million (4.5% of payroll).

The fair value rate of return over the last 10 years has ranged from a low of -0.1% to a high of 23.5%, with an average of 8.2%. However, looking over a longer historical period of 20 years, the fair value rate of return has an average of 5.7%.

#### Longevity Risk

The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the TRS funding policy and statutorily required contribution requirement.

#### Contribution Risk

The TRS funding policy contribution requires payment of the System's normal cost and an amortization payment according to a schedule sufficient to pay down unfunded actuarial liability over time. If the TRS funding policy contribution were adhered to, contribution risk would be negligible.



## Section 2: Actuarial Valuation Results

### E. Risk *continued*

#### **Contribution Risk** *continued*

However, Plan contributions are set by statute. The statutorily-required amount systematically underfunds TRS. Among other things, it: a) is based on a funding target of 90% of the actuarial accrued liability (as opposed to 100%); b) requires the use of the projected unit credit cost method, which further back loads the contributions to TRS as compared to the entry age normal cost method, which is a level cost funding method; c) imposes a maximum contribution based upon Pension Obligation Bond (POB) debt payments despite the fact that not all of the POB proceeds were contributed to TRS; and d) requires Tier II benefit provisions for members to be hired in the future be reflected in the determination of the contribution, resulting in reduced and back-loaded contributions.

If contributions remain at current level and future experience matches the current assumptions, we project the unfunded actuarial accrued liability will not be paid off.

#### **Demographic Risk**

Examples of this risk include:

- Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
- More or less active participant turnover than assumed.
- Individual salary increases higher or lower than assumed.

#### **Actual Experience Over the Last 10 years and Implications for the Future**

Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past ten years:

- The investment gain/(loss) for a year has ranged from a gain of \$1,792 million to a loss of \$1,806 million.
- The non-investment gain/(loss) for a year has ranged from a gain of \$592 million to a loss of \$1,342 million.
- The funded percentage on the actuarial value of assets has ranged from a low of 39.8% to a high of 46.5% since 2011.

#### **Maturity Measures**

As pension plans mature, the cash need to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Plan's asset allocation is aligned to meet emerging pension liabilities.

Currently the Plan has a full-time actives to annuitant ratio of 1.09. For the prior year, contributions received were \$1.20 billion less than benefits paid. As the Plan continues to mature, more cash will be needed from the investment portfolio to meet benefit payments.

# Section 3: Supplemental Information

## Exhibit A – Summary of Membership Data

Category	Valuation as of June 30*		Change From Prior Year
	2020	2019	
<b>Active members:</b>			
1. Number			
a. Full-time and regular part-time			
Tier I	103,691	106,275	(2.43%)
Tier II	32,061	27,885	14.98%
Total	135,752	134,160	1.19%
b. Substitutes, part-time, and hourly paid			
Tier I	12,570	13,297	(5.47%)
Tier II	14,753	13,295	10.97%
Total	27,323	26,592	2.75%
c. Total number of active members			
Tier I	116,261	119,572	(2.77%)
Tier II	46,814	41,180	13.68%
Total	163,075	160,752	1.45%
2. Annual salaries			
a. Full-time and regular part-time			
Tier I	\$8,401,822,836	\$8,370,721,244	0.37%
Tier II	1,718,486,638	1,437,244,143	19.57%
Total	\$10,120,309,474	\$9,807,965,387	3.18%
b. Substitutes, part-time, and hourly paid			
Tier I	\$83,475,985	\$84,574,824	(1.30%)
Tier II	79,859,224	70,369,553	13.49%
Total	\$163,335,209	\$154,944,377	5.42%
c. Total number of active members			
Tier I	\$8,485,298,821	\$8,455,296,068	0.35%
Tier II	1,798,345,862	1,507,613,696	19.28%
Total	\$10,283,644,683	\$9,962,909,764	3.22%

\*Member data used in the valuation is as of the prior valuation date.

## Section 3: Supplemental Information

### Exhibit A – Summary of Membership Data *continued*

Category	Valuation as of June 30*		Change From Prior Year
	2020	2019	
<b>Active members (continued):</b>			
3. Average age			
a. Full-time and regular part-time	42.2	42.0	N/A
b. Substitutes, part-time, and hourly paid	45.8	45.5	N/A
c. Total	42.8	42.6	N/A
4. Average service			
a. Full-time and regular part-time	13.2	13.1	N/A
b. Substitutes, part-time, and hourly paid	2.3	2.4	N/A
c. Total	11.4	11.3	N/A
<b>Inactive members:</b>			
Eligible for deferred annuities	19,363	19,726	(1.84%)
Eligible for refunds or single sum benefits	<u>121,908</u>	<u>119,833</u>	1.73%
Total	141,271	139,559	1.23%
<b>Service retirees:</b>			
1. Number			
a. Regular	80,064	77,628	3.14%
b. ERI	8,368	8,720	(4.04%)
c. ERO	<u>23,595</u>	<u>24,108</u>	(2.13%)
d. Total	112,027	110,456	1.42%
2. Annual annuities			
a. Regular	\$4,313,682,589	\$4,065,125,791	6.11%
b. ERI	529,261,885	535,961,733	(1.25%)
c. ERO	<u>1,736,595,235</u>	<u>1,715,171,725</u>	1.25%
d. Total	\$6,579,539,709	\$6,316,259,249	4.17%
3. Average age	72.3	71.9	N/A
4. Average monthly benefit	\$4,894	\$4,765	2.71%

\*Member data used in the valuation is as of the prior valuation date.

## Section 3: Supplemental Information

### Exhibit A – Summary of Membership Data *continued*

Category	Valuation as of June 30*		Change From Prior Year
	2020	2019	
<b>Disability Annuitants:</b>			
1. Number			
a. Retirement Allowance	825	816	1.10%
b. Occupational	7	8	(12.50%)
c. Temporary	<u>257</u>	<u>279</u>	(7.89%)
d. Total	1,089	1,103	(1.27%)
2. Annual annuities			
a. Retirement Allowance	\$24,253,789	\$23,163,914	4.71%
b. Occupational	283,635	323,779	(12.40%)
c. Temporary	<u>8,181,739</u>	<u>8,673,612</u>	(5.67%)
d. Total	\$32,719,163	\$32,161,305	1.73%
3. Average age	60.3	59.9	N/A
4. Average monthly benefit	\$2,504	\$2,430	3.04%
<b>Survivor Annuitants:</b>			
1. Number			
a. Children	73	75	(2.67%)
b. Survivors	11,392	11,058	3.02%
c. Reversionary	<u>210</u>	<u>203</u>	3.45%
d. Total	11,675	11,336	2.99%
2. Annual annuities			
a. Retirement Allowance	\$893,923	\$901,176	(0.80%)
b. Occupational	305,532,658	282,235,640	8.25%
c. Temporary	<u>8,796,081</u>	<u>8,409,957</u>	4.59%
d. Total	\$315,222,662	\$291,546,773	8.12%
3. Average age	78.4	78.2	N/A
4. Average monthly benefit	\$2,250	\$2,143	4.99%
<b>Total number of participants</b>	<b>429,137</b>	<b>423,206</b>	<b>1.40%</b>

\*Member data used in the valuation is as of the prior valuation date.

## Section 3: Supplemental Information

### Exhibit B – Active Membership Data as of June 30, 2019 used in June 30, 2020 Actuarial Valuation (Number and Average Annual Salary)

Age	Full-Time and Regular Part-Time									
	Total	Years of Service								
		0 – 4	5 – 9	10 – 14	15 – 19	20 – 24	25 – 29	30 – 34	35 - 39	40 & over
Under 25	3,248	3,248	--	--	--	--	--	--	--	--
	\$44,498	\$44,498	--	--	--	--	--	--	--	--
25 – 29	13,803	9,516	4,287	--	--	--	--	--	--	--
	\$51,850	\$49,911	\$56,155	--	--	--	--	--	--	--
30 – 34	19,384	4,635	10,544	4,205	--	--	--	--	--	--
	\$60,688	\$53,653	\$60,329	\$69,344	--	--	--	--	--	--
35 – 39	23,697	3,030	4,528	11,820	4,319	--	--	--	--	--
	\$70,980	\$55,386	\$62,794	\$73,788	\$82,816	--	--	--	--	--
40 – 44	22,625	2,247	2,624	4,771	9,811	3,172	--	--	--	--
	\$79,017	\$54,798	\$61,844	\$75,319	\$85,965	\$94,455	--	--	--	--
45 – 49	20,646	1,543	1,956	3,123	4,416	7,153	2,455	--	--	--
	\$85,023	\$56,960	\$63,025	\$73,706	\$86,965	\$95,767	\$99,785	--	--	--
50 – 54	16,535	948	1,262	2,150	2,677	3,116	4,924	1,458	--	--
	\$88,958	\$55,961	\$62,160	\$72,506	\$85,269	\$95,091	\$102,442	\$105,993	--	--
55 – 59	11,061	553	751	1,509	2,048	1,873	2,006	2,205	116	--
	\$88,681	\$56,318	\$63,610	\$73,335	\$82,277	\$90,854	\$102,024	\$106,666	\$110,255	--
60 – 64	3,768	250	312	615	952	704	545	238	130	22
	\$85,124	\$55,484	\$64,564	\$73,296	\$85,024	\$91,821	\$98,420	\$105,005	\$115,045	\$112,870
65 – 69	832	55	67	110	200	181	93	59	27	40
	\$86,884	\$55,927	\$64,636	\$75,168	\$86,035	\$90,643	\$99,825	\$104,811	\$114,365	\$111,080
70 & Older	153	17	8	19	28	35	20	9	7	10
	\$89,567	\$60,707	\$56,172	\$79,932	\$93,187	\$94,034	\$94,763	\$102,347	\$103,830	\$125,997
Total	135,752	26,042	26,339	28,322	24,451	16,234	10,043	3,969	280	72
	\$74,550	\$51,808	\$60,666	\$73,255	\$85,176	\$94,582	\$101,451	\$106,282	\$112,715	\$113,699

## Section 3: Supplemental Information

### Exhibit C – 10-Year History of Active Membership Data

Full-Time and Regular Part-Time					
Census Date June 30	Number	Percentage Change in Membership	Total Salaries	Average Annual Salary	Percent Change in Average Salary
2010	137,711	N/A	\$9,412,873,000	\$68,352	N/A
2011	133,752	(2.9%)	9,358,470,000	69,969	2.4%
2012	132,956	(0.6%)	8,874,281,176	66,476	(4.6%)
2013	132,886	(0.1%)	8,984,821,118	67,613	1.3%
2014	132,916	0.0%	9,115,480,030	68,581	1.4%
2015	133,478	0.4%	9,286,852,068	69,576	1.5%
2016	133,505	0.0%	9,450,737,426	70,789	1.7%
2017	133,761	0.2%	9,610,001,605	71,845	1.5%
2018	134,160	0.3%	9,807,965,387	73,106	1.8%
2019	135,752	1.2%	10,120,309,474	74,550	2.0%

Substitutes, Part-Time and Hourly Paid					
Census Date June 30	Number	Percentage Change in Membership	Total Salaries	Average Annual Salary	Percent Change in Average Salary
2010	32,479	N/A	\$161,461,000	\$4,971	N/A
2011	32,120	(1.1%)	153,261,000	4,772	(4.0%)
2012	29,073	(9.5%)	154,240,000	5,305	11.2%
2013	28,104	(3.3%)	143,217,984	5,096	(3.9%)
2014	26,920	(4.2%)	143,897,458	5,345	4.9%
2015	26,206	(2.7%)	148,630,024	5,672	6.1%
2016	26,080	(0.5%)	154,723,494	5,933	4.6%
2017	26,664	2.2%	152,390,955	5,715	(3.7%)
2018	26,592	(0.3%)	154,944,377	5,827	2.0%
2019	27,323	2.8%	163,335,209	5,978	2.6%

## Section 3: Supplemental Information

### Exhibit D – History of Active Membership Data

Tier I					
Census Date June 30	Number	Percentage Change in Membership	Total Salaries	Average Annual Salary	Percent Change in Average Salary
2013	144,987	N/A	\$8,975,899,676	\$61,908	N/A
2014	138,700	(4.3%)	8,705,746,049	62,767	1.4%
2015	133,498	(3.8%)	8,649,528,420	64,791	3.2%
2016	128,262	(3.9%)	8,587,965,096	66,956	3.3%
2017	123,933	(3.4%)	8,508,107,682	68,651	2.5%
2018	119,572	(3.5%)	8,455,296,068	70,713	3.0%
2019	116,261	(2.8%)	8,485,298,821	72,985	3.2%

Tier II					
Census Date June 30	Number	Percentage Change in Membership	Total Salaries	Average Annual Salary	Percent Change in Average Salary
2013	16,003	N/A	\$360,008,829	\$22,496	N/A
2014	21,136	32.1%	553,631,439	26,194	16.4%
2015	26,186	23.9%	785,878,433	30,011	14.6%
2016	31,323	19.6%	1,017,495,824	32,484	8.2%
2017	36,492	16.5%	1,254,284,878	34,372	5.8%
2018	41,180	12.9%	1,507,613,696	36,610	6.5%
2019	46,814	13.7%	1,798,345,863	38,415	4.9%

\* Note: Membership data by Tier includes substitutes, part-time, and hourly paid members.

## Section 3: Supplemental Information

### Exhibit E – 10-Year History of Annuitant and Survivor Annuitant Membership

Valuation as of June 30	Number	Percentage Change in Number of Recipients	Annual Allowances	Percent Change in Allowances	Average Annual Annuity
2010	101,352	N/A	\$4,418,017,000	N/A	\$43,591
2011	105,499	4.1%	4,780,743,000	8.2%	45,316
2012	106,102	0.6%	4,811,370,000	0.6%	45,347
2013	109,448	3.2%	5,204,460,272	8.2%	47,552
2014	112,682	3.0%	5,505,783,524	5.8%	48,861
2015	115,273	2.3%	5,728,198,887	4.0%	49,692
2016	117,990	2.4%	6,033,050,890	5.3%	51,132
2017	120,453	2.1%	6,336,471,817	5.0%	52,605
2018	122,895	2.0%	6,639,967,327	4.8%	54,030
2019	124,791	1.5%	6,927,481,533	4.3%	55,513



## Section 3: Supplemental Information

### Exhibit F – Benefit Stream for Guaranteed Minimum Annuity Reserve

Fiscal Year	Projected Benefit Stream for Guaranteed Minimum Annuity Reserve	Fiscal Year	Projected Benefit Stream for Guaranteed Minimum Annuity Reserve
2021	\$402,251	2046	\$9,742
2022	356,234	2047	8,023
2023	312,954	2048	6,548
2024	273,383	2049	5,250
2025	238,185	2050	4,189
2026	207,231	2051	3,301
2027	180,079	2052	2,565
2028	156,425	2053	1,964
2029	135,816	2054	1,481
2030	117,896	2055	1,097
2031	102,356	2056	798
2032	88,860	2057	570
2033	77,109	2058	400
2034	66,868	2059	275
2035	57,901	2060	174
2036	50,059	2061	112
2037	43,191	2062	71
2038	37,174	2063	43
2039	31,907	2064	25
2040	27,302	2065	15
2041	23,282	2066	8
2042	19,759	2067	4
2043	16,705	2068	2
2044	14,049	2069	1
2045	11,736	2070	1

## Section 3: Supplemental Information

### Exhibit G – Reconciliation of Membership Data

	Active Members	Inactive Members Eligible for Allowance	Inactive Members Eligible for Refund	Service Retirees	Disabled Retirees	Beneficiaries	Deferred Beneficiaries	Total
A. Number as of June 30, 2018	160,752	19,695	119,833	110,456	1,103	11,336	31	423,206
B. New members	11,994	N/A	N/A	N/A	N/A	N/A	N/A	11,994
C. Participant movement								
1. Retirements	(3,167)	(606)	(159)	3,932	0	0	0	0
2. Disabilities	(102)	0	0	0	102	0	0	0
3. Conversion from disability to service pension	N/A	N/A	N/A	33	(33)	N/A	N/A	0
4. Died with beneficiary	(31)	(1)	(1)	(890)	(11)	1,018	2	86*
5. Died without beneficiary	(66)	(32)	(291)	(1,519)	(22)	(666)	0	(2,596)
6. Terminations – with vested rights	(2,108)	2,108	0	0	0	0	0	0
7. Terminations – without vested rights	(8,232)	0	8,232	0	0	0	0	0
8. Refunds	(597)	(785)	(2,180)	N/A	N/A	N/A	0	(3,562)
9. Rehired as active	4,632	(1,042)	(3,550)	(1)	(39)	0	0	0
10. Temporary annuity expired	N/A	N/A	NA	N/A	N/A	(5)	N/A	(5)
D. Data adjustment	<u>0</u>	<u>0</u>	<u>24</u>	<u>16</u>	<u>(11)</u>	<u>(8)</u>	<u>(7)</u>	<u>14</u>
E. Number as of June 30, 2019	163,075	19,337	121,908	112,027	1,089	11,675	26	429,137

\* Includes multiple beneficiaries

## Section 3: Supplemental Information

### Exhibit H – Summary Statement of Income and Expenses on a Fair Value Basis

	Year Ended June 30, 2020	Year Ended June 30, 2019
<b>Net assets at fair value at the beginning of the year</b>	\$53,262,789,367	\$51,969,546,694
<b>Contribution income:</b>		
Members	\$994,400,416	\$963,972,120
State of Illinois	4,813,451,679	4,466,020,692
Employers:		
Early retirement	2,715	32,449
Federal funds	23,215,568	18,472,267
2.2 Benefit formula	61,448,091	62,744,266
Excess salary/sick leave	7,991,864	7,265,799
Total contribution income	\$5,900,510,333	\$5,518,507,593
<b>Investment income:</b>		
Net appreciation (depreciation)	(\$612,669,770)	\$1,491,025,634
Alternative	889,779,706	975,251,437
Interest and dividends	851,670,919	924,617,550
Other	8,623,422	35,183,396
Securities lending	9,370,679	11,541,157
Less alternatives expense	(465,877,890)	(470,341,524)
Less direct investment expense	(404,665,431)	(348,753,860)
Less securities lending management fees	(562,237)	(692,458)
Net investment income	<u>275,669,398</u>	<u>2,617,831,332</u>
<b>Total income available for benefits</b>	\$6,176,179,731	\$8,136,338,925
<b>Less benefit payments and administrative expenses:</b>		
Retirement benefits	(\$6,672,266,721)	(\$6,405,907,842)
Survivor benefits	(329,872,581)	(306,502,713)
Disability benefits	(33,168,197)	(33,133,627)
Refund of contributions	(64,217,456)	(73,216,390)
Administrative expenses	(22,966,372)	(24,335,680)
Net benefit payments and administrative expenses	<u>(\$7,122,491,327)</u>	<u>(\$6,843,096,252)</u>
<b>Net assets at fair value at the end of the year</b>	\$52,316,477,771	\$53,262,789,367

## Section 3: Supplemental Information

### Exhibit I – Summary Statement of System Assets

	Year Ended June 30, 2020	Year Ended June 30, 2019
<b>Cash equivalents</b>	\$24,329,683	\$27,358,430
<b>Accounts receivable and prepaid expenses:</b>		
Member contributions	\$71,553,987	\$55,256,930
Employer contributions	10,866,919	8,215,327
State of Illinois	641,247,379	558,757,463
Investment income	131,878,957	344,551,118
Investments sold	3,639,595,787	6,195,921,852
Prepaid expenses	<u>1,649,596</u>	<u>2,171,724</u>
Total accounts receivable and prepaid expenses	\$4,496,792,625	\$7,164,874,414
<b>Investments at fair value:</b>		
Fixed income	\$9,887,918,930	\$11,434,967,808
Public equities	16,764,439,384	17,823,681,423
Alternative investments	23,063,736,143	21,926,188,422
Derivatives	6,184,038	(55,888,377)
Short-term investments	1,652,527,489	1,601,845,805
Foreign currency	<u>79,352,928</u>	<u>95,012,450</u>
Total investments	\$51,454,158,912	\$52,825,807,531
<b>Invested securities lending collateral</b>	2,023,876,139	2,540,713,046
<b>Capital assets, net of accumulated depreciation</b>	<u>6,130,809</u>	<u>2,856,794</u>
<b>Total assets</b>	\$58,005,288,168	\$62,561,610,215
<b>Less accounts payable:</b>		
Benefits and refunds payable	(\$9,908,110)	(\$6,844,767)
Administrative and investment expenses payable	(49,768,751)	(44,756,293)
Pending investment purchases	(3,605,267,896)	(6,706,535,186)
Securities lending collateral	<u>(2,023,865,640)</u>	<u>(2,540,684,602)</u>
Total accounts payable	<u>(\$5,688,810,397)</u>	<u>(\$9,298,820,848)</u>
<b>Net assets at fair value</b>	<u>\$52,316,477,771</u>	<u>\$53,262,789,367</u>

## Section 3: Supplemental Information

### Exhibit J – History of System Revenue and Expenses

Year Ending June 30	Fair Value of Assets Beginning of Year	Member Contributions	Employer Contributions	Net Investment Return	Admin Expenses	Benefit Payments	Fair Value of Assets End of Year	Investment Return*
2011	\$31,323,784,214	\$909,577,109	\$2,326,028,622	\$7,234,539,490	\$17,792,071	\$4,304,870,170	\$37,471,267,194	23.6%
2012	37,471,267,194	917,661,328	2,561,259,102	224,106,719	19,011,899	4,638,457,105	36,516,825,339	0.8%
2013	36,516,825,339	921,422,657	2,860,491,456	4,561,768,383	20,257,553	4,981,481,783	39,858,768,499	12.7%
2014	39,858,768,499	928,745,853	3,596,717,490	6,782,031,720	21,218,069	5,320,662,979	45,824,382,514	17.2%
2015	45,824,382,514	935,451,049	3,523,256,530	1,770,549,533	21,686,860	5,625,037,173	46,406,915,593	3.9%
2016	46,406,915,593	951,809,398	3,890,510,012	(44,103,178)	22,967,917	5,931,207,177	45,250,956,731	(0.1%)
2017	45,250,956,731	929,130,165	4,135,859,276	5,520,453,001	22,728,735	6,438,005,920	49,375,664,518	12.4%
2018	49,375,664,518	938,037,245	4,179,758,475	4,049,271,728	21,550,896	6,551,634,376	51,969,546,694	8.3%
2019	51,969,546,694	963,972,120	4,554,535,473	2,617,831,332	24,335,680	6,818,760,572	53,262,789,367	5.1%
2020	53,262,789,367	994,400,416	4,906,109,917	275,669,398	22,966,372	7,099,524,955	52,316,477,771	0.5%

\* Calculated by the actuary and may not match the investment return reported in the Comprehensive Annual Financial Report.

## Section 3: Supplemental Information

### Exhibit K – Development of Unfunded Actuarial Accrued Liability

	Year Ended June 30	
	2020	2019
1. Unfunded actuarial accrued liability at beginning of year	\$78,065,776,220	\$75,288,440,204
2. Total normal cost at beginning of year	2,067,036,527	2,051,272,978
3. Total member and employer contributions*	5,849,516,439	5,517,256,877
4. Interest on:		
(a) Unfunded actuarial accrued liability and normal cost	\$5,609,296,892	\$5,413,779,923
(b) Total contributions	<u>204,733,075</u>	<u>193,103,991</u>
(c) Total interest: (4a) – (4b)	<u>5,404,563,817</u>	<u>5,220,675,932</u>
5. Expected unfunded actuarial accrued liability: (1) + (2) – (3) + (4c)	\$79,687,860,125**	\$77,043,132,237
6. Changes due to (gain)/loss from:		
(a) Investments	\$972,850,068	\$589,910,262
(b) Demographics	<u>46,860,992</u>	<u>352,015,736</u>
(c) Total changes due to (gain)/loss: (6a) + (6b)	<u>1,019,711,060</u>	<u>941,925,998</u>
7. Change due to new buyout provisions	0	0
8. Change in actuarial assumptions	<u>0</u>	<u>80,717,984</u>
9. Unfunded actuarial accrued liability at end of year: (5) + (6c) + (7) + (8)	<u>\$80,707,571,185</u>	<u>\$78,065,776,220</u>

\* Excludes guaranteed minimum annuity contributions, excess sick leave contributions, and penalty contributions.

\*\* The unfunded actuarial accrued liability increased \$1,622,083,905 during the year ended June 30, 2020 due to total contributions being less than total normal cost plus interest on the unfunded actuarial accrued liability.

# Section 4: Reporting Information

## Exhibit I – Derivation of Employer Contributions under Illinois Pension Code

	Fiscal Year Ending June 30, 2022	As Percentage of Total Payroll
1. Assumed Payroll:		
a. Total payroll	\$11,470,434,147	
b. Less Federal Funds payroll	<u>(229,408,683)</u>	
c. State payroll	\$11,241,025,464	
2. Employer contribution that would have been required without funds provided by Sec. 7.2(d) of General Obligation Bond Act		
a. Employer's cost	\$6,212,402,313	54.16%
b. Less School Districts' contributions under Sec. 16-158	(74,211,665)	(0.65%)
c. Less Federal Funds contribution	(23,652,035)	(0.21%)*
d. Less State debt service for TRS portion of all funds provided under Sec 7.2 of General Obligation Bond Act	<u>(443,731,640)</u>	<u>(3.87%)</u>
e. Maximum State contribution under PA 94-0004	\$5,670,806,973	49.43%
3. Employer contribution recognizing all system assets, before limiting State contribution		
a. Employer's cost	\$5,900,259,838	51.44%
b. Less School Districts' contributions under Sec. 16-158	(74,211,665)	(0.65%)
c. Less Federal Funds contribution	<u>(23,652,035)</u>	<u>(0.21%)*</u>
d. State contribution	\$5,802,396,138	50.58%
4. State contribution under PA 100-0023		
a. Lesser of amounts under (2) and (3)	\$5,670,806,973	49.43%
b. Phase-in of the effect of assumption changes	<u>22,900,000</u>	<u>0.20%</u>
c. State contribution	\$5,693,706,973**	49.63%
5. Employer contributions		
a. State contribution	\$5,693,706,973	49.63%
b. Plus School Districts' contributions under Sec. 16-158	74,211,665	0.65%
c. Plus Federal Funds contribution	<u>23,652,035</u>	<u>0.21%*</u>
d. Total employer contribution	\$5,791,570,673	50.49%

\* Federal Funds contribution is equal to 10.31% of assumed Federal Funds payroll.

\*\* The Benefit Trust Reserve State Contribution does not include the Guaranteed Minimum Annuity Reserve contribution. See page 39 for more details.

## Section 4: Reporting Information

### Exhibit I – Derivation of Employer Contributions under Illinois Pension Code *continued*

#### Notes about employer contributions

**1) Assumed Payrolls**

TRS staff estimated that Federal Funds payroll for the fiscal year ending June 30, 2022 would be 2.00% of total payroll.

**2) Determination of Maximum State Contribution under Public Act 94-0004**

Under Section 7.2(d) of the General Obligation Bond Act (GOBA), TRS received \$4.33 billion on July 2, 2003. Commencing with fiscal year 2005, the maximum State contribution under the Act equals the State contribution that would have been required had the \$4.33 billion contribution not been made, reduced, but not below zero, by the State's debt service on the TRS portion of the full \$10 billion of Pension Obligation Bonds issued under Section 7.2 of the GOBA.

**3) Employer Contribution Recognizing \$4.33 Billion Received July 2, 2003**

A gross employer contribution is determined that recognizes all System assets, and that meets the cost of maintaining and administering the System on a 90% funded basis by June 30, 2045, with a level percentage of payroll contribution after a 15-year phase-in beginning in fiscal year 1996.

**4) State and Federal Funds Contribution under Public Act 100-0023**

The State contribution is the lesser of the maximum contribution determined under (2) or the contribution determined under (3), adjusted to reflect the phase-in of the effect of assumption changes. In accordance with Public Act 100-0340, the Federal Funds contribution rate is equal to the employer normal cost rate.

**5) Employer Contributions**

The required employer contribution equals the sum of the State, Federal, and School Districts' contributions. For fiscal year 2022, the expected School Districts' contributions under Sec. 16-158(e), 16-158(f), and 16-158(i-5) are \$66,528,518, \$4,063,578, and \$3,619,569, respectively.

**6) State Contribution Amount for FY 2006 and FY 2007 under Public Act 94-0004**

PA 94-0004 specified actual contribution amounts for fiscal years 2006 and 2007 made by the State to the Benefit Trust Reserve.



## Section 4: Reporting Information

### Exhibit I – Derivation of Employer Contributions under Illinois Pension Code *continued*

Notes about employer contributions *continued*

**Additional information:**

The following contributions made to the Benefit Trust Reserve are not shown on Exhibit I:

**a) From Members:**

- i) Sec. 16-128 payments for the purchase of optional service credit
- ii) Sec. 16-152 career contributions of 9.0% of salary

**b) From School Districts:**

- i) Sec. 16-128(d-10) payments for excessive sick leave service credit

Although these types of contributions are not shown in the exhibits, they are all, with the exception of Sec. 16-128(d-10) payments and Sec. 16-128 member payments for the purchase of optional service credit, taken into account in the actuarial projection of the assets and funded status of the system. The actuarial projection is performed after the above contributions have been taken into account.

Payments under Sec. 16-158(f) have been included since the recertified June 30, 2004, valuation. There are no current assumptions for excessive sick leave service credit, and therefore the actuarial projections do not currently include projected payments under Sec. 16-128(d-10).

The methodology for calculating the Federal Funds contribution and, therefore, the State contribution has been changed effective for fiscal years 2021 and thereafter. Based on the modified approach, the Federal Funds contributions are treated in a similar manner as some School District contributions (i.e., a stream of projected contributions estimated as of the valuation date) resulting in the State contribution being the level percent of payroll required to attain 90% funded by fiscal year 2045.

## Section 4: Reporting Information

### Exhibit II – Development of Statutory State Contribution under Illinois Pension Code

	Fiscal Year Ending June 30, 2022
1. Present value as of June 30, 2021 of future obligations to fund:	
a. 90% of June 30, 2045 Actuarial Accrued Liability	\$37,023,215,704
b. Benefit disbursements and administrative expenses through June 30, 2045	<u>124,504,628,813</u>
c. Total	\$161,527,844,517
2. Projected actuarial value of assets as of June 30, 2021	
a. With POB proceeds	57,460,782,283
b. Without POB proceeds	52,769,459,224
3. Present value as of June 30, 2021 of future member contributions through June 30, 2045	15,515,466,477
4. Present value as of June 30, 2021 of future School District contributions through June 30, 2045	
a. 2.2% formula under §16-158(e)	\$999,885,617
b. 6% FAS cap increases under §16-158(f)	62,429,845
c. Salaries above the Governor's salary under §16-158(i-5)	<u>62,514,087</u>
d. Total	\$1,124,829,549
5. Present value as of June 30, 2021 of future Federal Funds contributions through June 30, 2045	220,067,269
6. Present value as of June 30, 2021 of future State contributions through June 30, 2045	
a. Including POB proceeds: (1c) – (2a) – (3) – (4d) – 5	87,206,698,939
b. Excluding POB proceeds: (1c) – (2b) – (3) – (4d) – 5	91,898,021,998
7. Present value as of June 30, 2021 of future covered payroll through June 30, 2045	172,394,071,963
8. Determination of preliminary contribution rates for State and Federal Funds for year ended June 30, 2022	
a. Including POB proceeds: (6a) / (7)	50.58%
b. Excluding POB proceeds: (6b) / (7)	53.30%

## Section 4: Reporting Information

### Exhibit II – Development of Statutory State Contribution under Illinois Pension Code *continued*

	Fiscal Year Ending June 30, 2022
9. Determination of State contribution for year ending June 30, 2022:	
a. Projected payroll:	\$11,470,434,147
b. State contribution before maximum:	
i) Gross contribution: (8a) x (9a)	\$5,802,396,138
ii) Phase-in of the effect of assumption changes	<u>(22,900,000)</u>
iii) Net contribution: (i) – (ii)	\$5,825,296,138
c. State contribution maximum:	
i) Gross maximum: (8b) x (9a)	\$6,114,538,613
ii) State's debt service	443,731,640
iii) Phase-in of the effect of assumption changes	<u>(22,900,000)</u>
iv) Net contribution: (i) – (ii) – (iii)	\$5,693,706,973
d. State contribution after maximum: minimum of (9b)(iii) and (9c)(iv)	\$5,693,706,973*

\* *The Benefit Trust Reserve State Contribution does not include the Guaranteed Minimum Annuity Reserve contribution. See page 39 for more details.*

## Section 4: Reporting Information

### Exhibit III – Development of State Contribution Based on Board-Adopted Actuarial Funding Policy

	Fiscal Year Ending June 30, 2022
1. Projected employer Normal Cost for year ending June 30, 2022	
a. Total	\$2,108,474,590
b. Administrative expenses	40,892,235
c. Member contributions	<u>1,032,339,073</u>
d. Employer Normal Cost: (a) + (b) – (c)	\$1,117,027,752
2. Projected Unfunded Actuarial Accrued Liability as of June 30, 2021	
a. Actuarial Accrued Liability	\$142,673,890,369
b. Actuarial Value of Assets	<u>57,460,782,283</u>
c. Unfunded Actuarial Accrued Liability: (a) – (b)	\$85,213,108,086
3. Payment toward projected Unfunded Actuarial Accrued Liability for year ending June 30, 2022 (see Exhibit IV)	7,830,891,256
4. Total employer contribution for year ending June 30, 2022: (1d) + (3)	\$8,947,919,008
5. Projected School District contributions for year ending June 30, 2022	
a. 2.2% formula under §16-158(e)	\$66,528,518
b. 6% FAS cap increases under §16-158(f)	4,063,578
c. Salaries above the Governor's salary under §16-158(i-5)	<u>3,619,569</u>
d. Total	\$74,211,665
6. Estimated Federal Funds contribution for year ending June 30, 2022	23,652,035
7. State contribution for year ending June 30, 2022: (4) – (5d) – (6)	\$8,850,055,308

## Section 4: Reporting Information

### Exhibit IV – Components of Unfunded Liability Bases and Amortization Payment under Board-Adopted Actuarial Funding Policy

	Original Amount	Balance as of June 30, 2021	Remaining Amortization Period	2022 Amortization
June 30, 2015 valuation base:				
Projected UAAL as of June 30, 2016	\$68,126,860,208	\$62,646,502,416	15	\$5,912,066,217
June 30, 2016 valuation base:				
Projected (gain)/loss as of June 30, 2017	8,625,889,107	8,109,002,137	16	732,655,606
June 30, 2017 valuation base:				
Projected (gain)/loss as of June 30, 2018	3,216,359,048	3,084,740,383	17	267,830,701
June 30, 2018 valuation base:				
Projected (gain)/loss as of June 30, 2019	3,150,844,586	3,072,886,254	18	257,230,609
June 30, 2019 valuation base:				
Projected (gain)/loss as of June 30, 2020	4,015,729,497	3,970,880,057	19	321,410,412
June 30, 2020 valuation base:				
Projected (gain)/loss as of June 30, 2021	4,329,096,839	<u>4,329,096,839</u>	20	<u>339,697,711</u>
Total		\$85,213,108,086		\$7,830,891,256

## Section 4: Reporting Information

### Exhibit V – Components of Phase-in of the Effect of Assumption Changes

Valuation Date June 30	Fiscal Year State Contribution First Affected	Effect on State Contribution	Phase in of the Effect of Assumption Changes for Fiscal Year				
			2021	2022	2023	2024	2025
2016	2018	\$410,000,000	(\$82,000,000)	--	--	--	--
2017	2019	--	--	--	--	--	--
2018	2020	(70,000,000)	42,000,000	\$28,000,000	\$14,000,000	--	--
2019	2021	8,500,000	(6,800,000)	(5,100,000)	(3,400,000)	(\$1,700,000)	--
2020	2022	--	--	--	--	--	--
Total			(\$46,800,000)	\$22,900,000	\$10,600,000	(\$1,700,000)	--

## Section 4: Reporting Information

### Exhibit VI – 10-Year History of Unfunded Actuarial Liability and Funded Ratio (\$ in thousands)

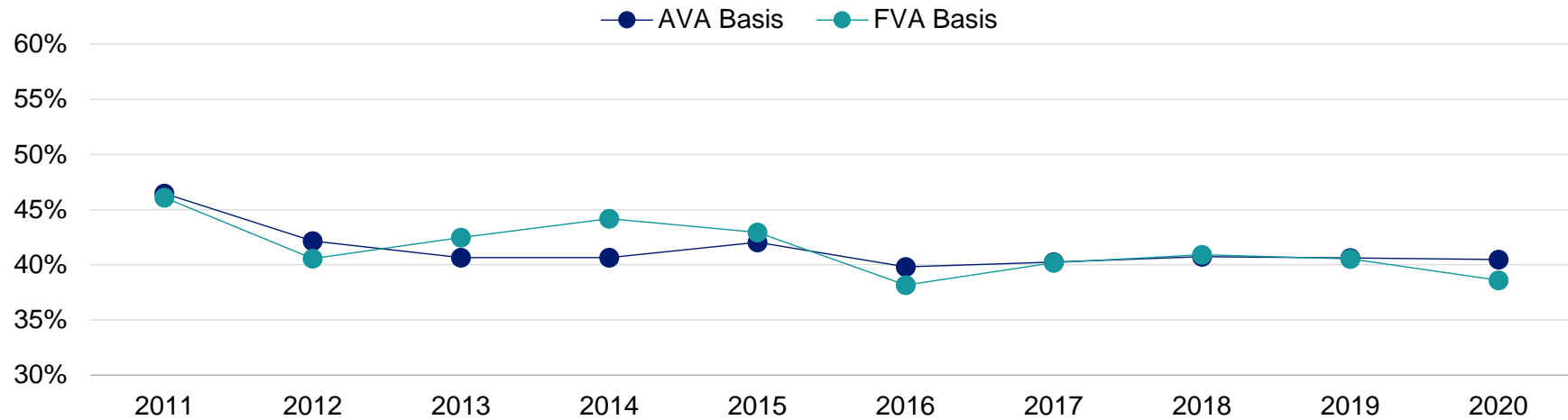
As of June 30	Assets			Unfunded Liability Using Assets Based on		Funded Ratio Using Assets Based on	
	Actuarial Accrued Liability	Actuarial Value of Assets	Fair Value of Assets	Actuarial Value of Assets	Fair Value of Assets	Actuarial Value of Assets	Fair Value of Assets
2011	\$81,299,745	\$37,769,753	\$37,471,267	\$43,529,992	\$43,828,478	46.5%	46.1%
2012	90,024,945	37,945,397	36,516,825	52,079,548	53,508,120	42.1	40.6
2013	93,886,989	38,155,191	39,858,768	55,731,798	54,028,220	40.6	42.5
2014	103,740,377	42,150,765	45,824,383	61,589,612	57,915,994	40.6	44.2
2015	108,121,825	45,435,193	46,406,916	62,686,632	61,714,909	42.0	42.9
2016	118,629,890	47,222,098	45,250,957	71,407,792	73,378,934	39.8	38.1
2017	122,904,034	49,467,525	49,375,665	73,436,509	73,528,370	40.2	40.2
2018	127,019,330	51,730,890	51,969,547	75,288,440	75,049,783	40.7	40.9
2019	131,456,969	53,391,193	53,262,789	78,065,776	78,194,180	40.6	40.5
2020	135,598,547	54,890,976	52,316,478	80,707,571	83,282,069	40.5	38.6

## Section 4: Reporting Information

### Exhibit VII – Funded Ratio

A critical piece of information regarding the System's financial status is the funded ratio. This ratio compares the actuarial value and fair value of assets to the actuarial accrued liabilities of the System as calculated. High ratios indicate a well-funded plan with assets sufficient to cover the plan's actuarial accrued liabilities. Lower ratios may indicate recent changes to benefit structures, funding of the plan below actuarial requirements, poor asset performance, or a variety of other factors.

The chart below depicts a history of the funded ratios for this System.





## Section 4: Reporting Information

### Exhibit VIII – Department of Insurance Information

	June 30, 2020	June 30, 2019
<b>Actuarial Accrued Liabilities:</b>		
Service Retirement	\$85,020,813,858	\$82,809,306,042
Disability Retirement	433,596,768	425,709,005
Survivor	<u>2,731,572,589</u>	<u>2,553,790,929</u>
Subtotal	\$88,185,983,215	\$85,788,805,976
Inactive	3,493,651,653	3,537,804,681
Active	<u>43,918,912,145</u>	<u>42,130,358,296</u>
Total	\$135,598,547,013	\$131,456,968,953
<b>Headcounts and Salaries for Active Members:</b>		
Male		
Count	37,797	37,477
Salaries	\$2,737,852,055	\$2,662,229,567
Female		
Count	125,278	123,275
Salaries	\$7,545,792,628	\$7,300,680,197
Total		
Count	163,075	160,752
Salaries	\$10,283,644,683	\$9,962,909,764

## Section 4: Reporting Information

### Exhibit IX – Roll Forward of Actuarial Accrued Liability and Normal Cost

Actuarial Accrued Liabilities Developed for June 30, 2020 Valuation		Amount
1.	Actuarial Accrued Liability measured as of June 30, 2019	\$131,224,977,697
2.	Normal Cost measured for fiscal year ended June 30, 2020	2,046,240,515
3.	Expected benefit payments for fiscal year ended June 30, 2020	7,159,843,409
4.	Interest on (1), (2), and (3) to June 30, 2020	9,078,390,756
5.	Adjustment for future AAI and APB buyouts as of June 30, 2020	<u>408,781,454</u>
6.	Actuarial Accrued Liability as of June 30, 2020: (1) + (2) – (3) + (4) + (5)	\$135,598,547,013
7.	Normal Cost measured for fiscal year ended June 30, 2021	2,067,771,015
8.	Expected benefit payments for fiscal year ended June 30, 2021	7,692,094,614*
9.	Interest on (6), (7), and (8) to June 30, 2021	<u>9,367,418,950</u>
10.	Actuarial Accrued Liability as of June 30, 2021 (6) + (7) – (8) + (9)	\$139,341,642,364

*Based on member census as of June 30, 2019, assumptions and methods as of June 30, 2020, including the Projected Unit Credit actuarial cost method.*

\* Includes \$246,890,200 of projected buyout payments expected to be paid via additional state funds not included in the FY2021 State contribution amount.

## Section 4: Reporting Information

### Exhibit X – State’s Share of the Contribution to TRS Necessary to Fund Normal Cost Plus Interest on the Unfunded Actuarial Accrued Liability (UAAL)

	Fiscal Year 2022
1. Employer normal cost plus interest on UAAL	
a. Employer normal cost	\$1,183,129,632
b. Interest on the projected June 30, 2021 UAAL	<u>5,569,285,905</u>
c. Total employer normal cost plus interest on UAAL	\$6,752,415,537
2. Contributions from sources other than State and Federal Funds	
a. School District contributions under §16-158(e)	(\$66,528,518)
b. School District contributions under §16-158(f)	(4,063,578)
c. School District contributions under §16-158(i-5)	(3,619,569)
d. Federal Funds contribution	<u>(23,348,881)</u>
e. Total contributions from sources other than State and Federal Funds	(\$97,560,546)
3. State share of normal cost plus interest on UAAL: (1c) + (2e)	\$6,654,854,991
4. State contribution requirement	
a. State’s share of normal cost plus interest on UAAL	\$6,654,854,991
b. Guaranteed Minimum Annuity Reserve contribution	<u>400,000</u>
c. Total State contribution requirement	\$6,655,254,991

## Section 4: Reporting Information

### Exhibit XI – Development of Actuarial Determined Contribution (ADC)

	Fiscal Year Ended June 30, 2020
<b>Development of the ADC:</b>	
1. Employer Normal Cost	\$1,097,240,566
2. Amortization of Unfunded Actuarial Accrued Liability	<u>6,891,371,717</u>
3. Actuarially Determined Contribution: (1) + (2)	\$7,988,612,283

The ADC for fiscal year ended June 30, 2020, is based on the valuation date of June 30, 2018, prepared by Segal.

Actuarial Cost Method:	Entry Age Normal
Amortization Method:	Layered
Amortization Period:	20 years
Payroll Growth Assumption:	2% (assumed rate of future State revenue growth)
Asset Valuation Method:	5-Year Smoothing
Investment Rate of Return:	7.00%
Projected Salary Increases:	4.00% – 9.50%; composite approximately 4.94%
Includes Inflation at:	2.50%
Post-retirement Increase:	Tier I 3% compounded Tier II 1.25% not compounded (lesser of 3% or 1/2 CPI increase, but not less than zero)

# Section 5: Projections

## Overview

Based on the results of the June 30, 2020, actuarial valuation, we have projected valuation results to June 30, 2046 commencing with Fiscal Year 2021.

Our projections of contributions, liabilities, and assets are based on the actuarial assumptions, membership data and benefit provisions that were used for the regular actuarial valuation.

In order to determine projected contributions, liabilities, and assets, certain calculations needed to be made that are not normally required in a regular actuarial valuation. Benefit payout requirements, actuarial liabilities, and payroll were estimated over the period from 2021 through 2046 by projecting the membership of TRS over the period, taking into account the impact of new entrants into the System.

To make the required projections, assumptions needed to be made regarding the age and salary distribution of new entrants as well as the size of the active membership of TRS. The characteristics regarding the profile of new entrants to TRS were revised for the June 30, 2020 valuation, per the recommendation of the State Actuary, to reflect the attributes of new hires over the past five years. The size of the active membership of the System was assumed to remain constant over the projection period. The results of our projections are shown on the following pages.

The assets haven been allocated by Tier for illustration purposes. Estimated Tier II assets were initially based on the June 30, 2013, accumulated member contributions of \$70,783,523, and have been rolled forward each year with expected member contributions, expected benefit payments, and the proportionate share of investment earnings.

## Section 5: Projections

### Table 1 – Projection of Funded Ratio to 2046

Amounts above the black line are based on prior valuations and amounts below the line are based on the current valuation.

Year Ended June 30	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Tier I Funded Ratio	Tier II Funded Ratio	Total Funded Ratio
1995	\$23,980,566,000	\$12,641,865,000	(\$11,338,701,000)			52.7%
1996	26,141,794,000	13,829,711,000	(12,312,083,000)			52.9%
1997	26,951,585,000	17,393,108,000	(9,558,477,000)			64.5%
1998	29,908,241,000	19,965,887,000	(9,942,354,000)			66.8%
1999	33,205,513,000	22,237,709,000	(10,967,804,000)			67.0%
2000	35,886,404,000	24,481,413,000	(11,404,991,000)			68.2%
2001	39,166,697,000	23,315,646,000	(15,851,051,000)			59.5%
2002	43,047,674,000	22,366,285,000	(20,681,389,000)			52.0%
2003	46,933,432,000	23,124,823,000	(23,808,609,000)			49.3%
2004	50,947,451,000	31,544,729,000	(19,402,722,000)			61.9%
2005	56,075,029,000	34,085,218,000	(21,989,811,000)			60.8%
2006	58,996,913,000	36,584,889,000	(22,412,024,000)			62.0%
2007	65,648,395,000	41,909,318,000	(23,739,077,000)			63.8%
2008	68,632,367,000	38,430,723,000	(30,201,644,000)			56.0%
2009	73,027,198,000	38,026,043,512	(35,001,154,488)			52.1%
2010	77,293,198,000	37,439,091,771	(39,854,106,229)			48.4%
2011	81,299,745,000	37,769,752,971	(43,529,992,029)			46.5%
2012	90,024,945,000	37,945,397,211	(52,079,547,789)			42.1%
2013	93,886,988,785	38,155,191,497	(55,731,797,288)			40.6%
2014	103,740,377,267	42,150,765,261	(61,589,612,006)	40.6%	120.5%	40.6%
2015	108,121,825,171	45,435,192,645	(62,686,632,526)	41.9%	162.8%	42.0%
2016	118,629,890,305	47,222,097,809	(71,407,792,496)	39.6%	153.9%	39.8%
2017	122,904,034,268	49,467,525,209	(73,436,509,059)	40.0%	144.0%	40.2%
2018	127,019,330,164	51,730,889,960	(75,288,440,204)	40.4%	130.9%	40.7%
2019	131,456,968,953	53,391,192,733	(78,065,776,220)	40.3%	124.7%	40.6%
2020	135,598,547,013	54,890,975,829	(80,707,571,184)	40.1%	113.7%	40.5%

## Section 5: Projections

### Table 1 – Projection of Funded Ratio to 2046 *continued*

Year Ended June 30	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Actuarial Accrued Liability	Tier I Funded Ratio	Tier II Funded Ratio	Total Funded Ratio
2021	\$139,358,761,207	\$57,012,891,041	(\$82,345,870,166)	40.4%	121.5%	40.9%
2022	143,162,786,496	59,128,426,847	(84,034,359,650)	40.7%	120.6%	41.3%
2023	147,201,689,302	61,249,647,061	(85,952,042,240)	40.9%	119.3%	41.6%
2024	151,258,656,487	63,727,981,213	(87,530,675,274)	41.3%	118.4%	42.1%
2025	155,316,328,757	67,077,915,193	(88,238,413,565)	42.2%	118.8%	43.2%
2026	159,361,969,607	70,615,607,000	(88,746,362,606)	43.1%	119.0%	44.3%
2027	163,373,062,247	74,287,714,260	(89,085,347,987)	44.1%	119.1%	45.5%
2028	167,331,148,998	78,076,150,530	(89,254,998,468)	45.1%	119.2%	46.7%
2029	171,219,753,306	81,988,535,313	(89,231,217,993)	46.1%	119.2%	47.9%
2030	175,018,711,038	86,013,960,182	(89,004,750,856)	47.1%	119.2%	49.1%
2031	178,706,458,688	90,160,260,848	(88,546,197,839)	48.1%	119.2%	50.5%
2032	182,260,044,092	94,446,899,388	(87,813,144,704)	49.2%	119.1%	51.8%
2033	185,652,734,238	98,892,369,491	(86,760,364,747)	50.4%	119.0%	53.3%
2034	188,864,751,140	104,243,055,781	(84,621,695,359)	52.0%	119.0%	55.2%
2035	191,876,430,493	109,830,059,924	(82,046,370,569)	53.8%	118.9%	57.2%
2036	194,677,297,507	115,685,085,830	(78,992,211,677)	55.6%	118.8%	59.4%
2037	197,251,038,226	121,842,328,785	(75,408,709,440)	57.7%	118.7%	61.8%
2038	199,569,095,958	128,327,719,673	(71,241,376,285)	59.9%	118.6%	64.3%
2039	201,615,612,289	135,179,814,423	(66,435,797,865)	62.3%	118.5%	67.0%
2040	203,379,105,591	142,444,685,326	(60,934,420,265)	65.0%	118.4%	70.0%
2041	204,883,551,393	150,207,544,283	(54,676,007,110)	68.0%	118.3%	73.3%
2042	206,125,504,525	158,526,659,906	(47,598,844,619)	71.4%	118.2%	76.9%
2043	207,134,842,310	167,490,528,922	(39,644,313,388)	75.3%	118.0%	80.9%
2044	207,960,496,887	177,206,947,472	(30,753,549,415)	79.7%	117.9%	85.2%
2045	208,661,484,270	187,795,335,843	(20,866,148,427)	84.7%	117.7%	90.0%
2046	209,304,921,787	188,374,429,608	(20,930,492,179)	84.1%	117.6%	90.0%

## Section 5: Projections

### Table 2 – Projection of Contributions to Trust to 2046 (Dollars)

Amounts above the black line are based on prior valuations and amounts below the line are based on the current valuation. See Notes.

Year Ended June 30	Contributions								
	Member	School District			Total	Federal Funds	State	Total	
		§16-158(e) (2.2 Formula)	§16-158(f) (6% FAS Cap)	§16-158(i-5) (Payroll above Gov.)					
1995	\$421,726,521	-	-	-	-	\$16,500,000	\$262,864,800	\$701,091,321	
1996	422,238,847	-	-	-	-	17,000,000	324,276,242	763,515,089	
1997	420,762,625	-	-	-	-	17,300,000	377,968,984	816,031,609	
1998	440,967,595	-	-	-	-	18,000,000	460,439,267	919,406,862	
1999	866,369,000	\$16,675,000	-	-	\$16,675,000	18,500,000	567,067,600	1,468,611,600	
2000	619,622,000	34,145,066	-	-	34,145,066	18,200,000	634,038,560	1,306,005,626	
2001	643,563,000	36,375,498	-	-	36,375,498	20,000,000	719,356,841	1,419,295,339	
2002	681,151,770	38,664,380	-	-	38,664,380	23,000,000	810,618,724	1,553,434,874	
2003	732,020,451	12,808,373	-	-	12,808,373	25,000,000	926,049,918	1,695,878,742	
2004	768,661,300	42,604,912	-	-	42,604,912	29,400,000	1,027,258,994	1,867,925,206	
2005	761,790,009	44,481,074	-	-	44,481,074	37,860,000	902,243,532	1,746,374,615	
2006	799,034,336	45,656,648	\$14,974,781	-	60,631,429	24,070,387	531,827,700	1,415,563,852	
2007	826,249,007	46,047,720	19,353,893	-	225,741,253	41,328,022	735,514,500	1,828,832,782	
2008	865,400,168	48,102,405	-	-	131,239,475	47,829,058	1,039,194,988	2,083,663,689	
2009	876,182,122	51,141,422	3,000,000	-	148,460,852	55,707,046	1,449,888,800	2,530,238,820	
2010	909,642,774	53,666,271	3,000,000	-	145,878,411	75,718,545	2,087,668,469	3,218,908,199	
2011	948,286,581	56,171,181	5,000,000	-	147,747,541	75,405,839	2,357,040,597	3,528,480,558	
2012	976,364,866	57,976,440	5,000,000	-	147,745,130	84,654,093	2,405,172,175	3,613,936,264	
2013	967,910,390	57,610,031	5,000,000	-	133,102,941	83,575,603	2,702,277,829	3,886,866,763	
2014	1,004,368,089	57,896,194	5,000,000	-	124,446,854	97,203,752	3,437,478,152	4,663,496,847	
2015	1,045,996,125	60,413,797	5,782,580	-	124,562,387	25,074,310	3,411,877,643	4,607,510,465	
2016	1,041,807,455	61,478,785	5,027,434	-	124,554,918	80,263,377	3,741,802,194	4,988,427,944	
2017	1,034,264,612	61,138,899	2,190,130	-	63,329,029	77,196,619	3,985,783,351	5,160,573,611	
2018	939,719,161	60,559,679	4,295,624	\$2,477,050	67,332,353	21,091,475	4,094,616,146	5,122,759,135	
2019	958,472,559	61,768,232	4,150,160	2,385,898	68,304,290	20,979,899	4,353,323,925	5,401,080,673	
2020	985,912,521	63,536,585	4,188,240	3,113,849	70,838,674	23,355,172	4,813,077,696	5,893,184,063	



## Section 5: Projections

### Table 2 – Projection of Contributions to Trust to 2046 (Dollars) *continued*

Year Ended June 30	Contributions							
	Member	School District			Total	Federal Funds	State	Total
		§16-158(e) (2.2 Formula)	§16-158(f) (6% FAS Cap)	§16-158(i-5) (Payroll above Gov.)				
2021	\$1,009,317,615	\$65,044,913	\$4,119,231	\$4,948,241	\$74,112,385	\$23,348,881	\$5,140,336,721	\$6,247,115,602
2022	1,032,339,073	66,528,518	4,063,578	3,619,569	74,211,665	23,652,035	5,693,706,973	6,823,909,746
2023	1,063,473,313	68,534,947	4,317,040	3,985,590	76,837,577	23,892,700	5,874,516,413	7,038,720,003
2024	1,094,903,925	70,560,475	4,407,760	4,400,798	79,369,034	23,795,912	6,077,544,029	7,275,612,900
2025	1,126,656,149	72,606,730	4,748,800	4,790,561	82,146,091	23,634,742	6,309,101,221	7,541,538,204
2026	1,157,414,074	74,588,907	4,845,120	5,142,984	84,577,011	23,379,764	6,535,444,304	7,800,815,154
2027	1,188,221,000	76,574,242	5,104,960	5,576,961	87,256,163	22,998,678	6,711,582,696	8,010,058,537
2028	1,218,528,671	78,527,403	5,207,440	5,922,884	89,657,727	22,502,163	6,871,382,410	8,202,070,971
2029	1,249,557,055	80,527,010	5,363,680	6,279,379	92,170,070	21,908,900	7,037,852,669	8,401,488,694
2030	1,281,099,337	82,559,735	5,684,000	6,689,131	94,932,866	21,209,311	7,194,933,874	8,592,175,389
2031	1,313,595,405	84,653,926	5,814,480	6,972,755	97,441,161	20,375,324	7,360,865,331	8,792,277,221
2032	1,346,247,228	86,758,155	5,957,280	7,234,485	99,949,920	19,415,877	7,545,562,363	9,011,175,387
2033	1,379,139,738	88,877,894	6,128,640	7,452,681	102,459,215	18,327,235	7,748,789,747	9,248,715,934
2034	1,412,399,432	91,021,297	6,100,080	7,387,631	104,509,008	17,105,726	8,665,135,738	10,199,149,905
2035	1,446,746,813	93,234,795	6,148,800	7,270,767	106,654,362	15,785,615	8,875,858,507	10,445,045,297
2036	1,482,469,424	95,536,918	6,048,000	7,099,466	108,684,384	14,396,425	9,095,018,374	10,700,568,607
2037	1,519,994,998	97,955,233	6,123,600	6,680,302	110,759,135	12,936,846	9,325,239,507	10,968,930,487
2038	1,558,899,313	100,462,400	6,293,280	6,215,947	112,971,627	11,293,359	9,563,919,274	11,247,083,574
2039	1,598,658,516	103,024,660	6,270,320	5,540,913	114,835,893	9,449,848	9,807,843,821	11,530,788,078
2040	1,639,706,289	105,669,961	6,254,640	4,652,407	116,577,008	7,542,649	10,059,673,805	11,823,499,751
2041	1,682,526,047	108,429,456	5,972,960	3,671,267	118,073,684	5,608,420	10,322,374,997	12,128,583,148
2042	1,727,283,862	111,313,849	5,660,480	2,648,227	119,622,556	3,723,256	10,596,966,258	12,447,595,932
2043	1,773,366,098	114,283,593	5,285,280	1,528,490	121,097,363	2,009,815	10,879,682,905	12,776,156,181
2044	1,820,744,304	117,336,855	4,830,560	405,230	122,572,645	485,532	11,170,350,389	13,114,152,869
2045	1,869,899,356	120,504,625	4,199,440	-	124,704,065	-	11,471,918,901	13,466,522,322
2046	1,921,297,381	123,816,942	3,576,160	-	127,393,102	-	1,145,841,914	3,194,532,397

## Section 5: Projections

### Table 2 – Projection of Contributions to Trust to 2046 (Dollars) *continued*

#### Notes

- 1) The administrative staff of the System estimated the Federal Funds contribution for fiscal years prior to 2006. Commencing with the contribution for fiscal 2006, total payroll for the valuation is split into State and Federal Funds payrolls. Federal Funds payrolls for 2006 – 2019 were estimated to be 4.33%, 5.32%, 4.40%, 3.70%, 3.50%, 3.10%, 3.40%, 3.00%, 2.75%, 3.00%, 2.10%, 1.90%, 2.00%, and 2.00%, respectively, of total payrolls for those years. For 2020 – 2022, the estimate is 2.00% of payroll. All payrolls are assumed to increase at the same rate for years subsequent to 2022.
- 2) School District contributions under Sec. 16-158(e) for years subsequent to 2005 are expected to equal 0.58% of total payroll. Sec. 16-158(f) contributions for 2008 – 2014 were estimated by the administrative staff of the System.
- 3) School District contributions under Sec. 16-133.2 are included in the total School District contributions for years 2007 – 2016, which can be found in the June 30, 2016 valuation report. These contributions no longer apply because the ERO was discontinued at the end of fiscal year 2016.
- 4) Employer Rates, Contribution Amounts, and Assumed Payroll shown for fiscal years 1995 – 2022 are based on the June 30, 1993 – June 30, 2020 actuarial valuations and are certified amounts, with the following exceptions. The 2006 amount is the recertified amount and 2007 is the certified amount required by per PA 94-0004. The 2011 amount is the originally certified amount, not the recertified amount per PA 96-1511. The 2015 amount is the certified amount; however, PA 98-0674 subsequently lowered state contributions and increased federal contributions. The 2017 Sec. 133.2 contribution was removed because ERO was discontinued at the end of fiscal 2016. The 2018 and 2019 amounts are the recertified amounts. Items subsequent to 2021 are based on the June 30, 2020 valuation.
- 5) Schedule excludes State ERI contributions of \$1,000,000 for 2004, and \$1,684,000 for 2005 (under Public Act 92-0056, as amended).
- 6) Effective for fiscal years 2021 and thereafter, the “FAS Cap” threshold reverted back to 6% to reflect the repeal of the 3% “FAS Cap” threshold per PA 101-001 (SB 1814).
- 7) The methodology for calculating the Federal Funds contribution and, therefore, the State contribution has been changed effective for fiscal years 2021 and thereafter. Based on the modified approach, the Federal Funds contributions are treated in a similar manner as some School District contributions (i.e., a stream of projected contributions estimated as of the valuation date) resulting in the State contribution being the level percent of payroll required to attain 90% funded by fiscal year 2045.

## Section 5: Projections

### Table 3 – Projection of Contributions to Trust to 2046 (Percent of Payroll)

Amounts above the black line are based on prior valuations and amounts below the line are based on the current valuation. See Notes.

Year Ended June 30	Assumed Payroll	Member	Contributions						
			School District			Federal Funds	State	Total	
			§16-158(e) (2.2 Formula)	§16-158(f) (6% FAS Cap)	§16-158(i-5) (Payroll above Gov.)				Total
1995	\$4,633,650,000	9.10%	-	-	-	-	0.36%	5.67%	15.13%
1996	4,863,544,432	8.68%	-	-	-	-	0.35%	6.67%	15.70%
1997	4,903,151,093	8.58%	-	-	-	-	0.35%	7.71%	16.64%
1998	5,264,732,966	8.38%	-	-	-	-	0.34%	8.75%	17.46%
1999	5,558,349,721	15.59%	0.30%	-	-	0.30%	0.33%	10.20%	26.42%
2000	5,887,080,405	10.53%	0.58%	-	-	0.58%	0.31%	10.77%	22.18%
2001	6,271,637,672	10.26%	0.58%	-	-	0.58%	0.32%	11.47%	22.63%
2002	6,666,272,399	10.22%	0.58%	-	-	0.58%	0.35%	12.16%	23.30%
2003	7,115,762,553	10.29%	0.18%	-	-	0.18%	0.35%	13.01%	23.83%
2004	7,345,674,585	10.46%	0.58%	-	-	0.58%	0.40%	13.98%	25.43%
2005	7,669,150,690	9.93%	0.58%	-	-	0.58%	0.49%	11.76%	22.77%
2006	7,871,835,902	10.15%	0.58%	0.19%	-	0.77%	0.31%	6.76%	17.98%
2007	7,939,262,146	10.41%	0.58%	0.24%	-	2.84%	0.52%	9.26%	23.04%
2008	8,293,518,065	10.43%	0.58%	-	-	1.58%	0.58%	12.53%	25.12%
2009	8,817,486,572	9.94%	0.58%	0.03%	-	1.68%	0.63%	16.44%	28.70%
2010	9,252,805,323	9.83%	0.58%	0.03%	-	1.58%	0.82%	22.56%	34.79%
2011	9,684,686,327	9.79%	0.58%	0.05%	-	1.53%	0.78%	24.34%	36.43%
2012	9,995,937,994	9.77%	0.58%	0.05%	-	1.48%	0.85%	24.06%	36.15%
2013	9,932,764,038	9.74%	0.58%	0.05%	-	1.34%	0.84%	27.21%	39.13%
2014	9,982,102,443	10.06%	0.58%	0.05%	-	1.25%	0.97%	34.44%	46.72%
2015	10,416,171,908	10.04%	0.58%	0.06%	-	1.20%	0.24%	32.76%	44.23%
2016	10,599,790,566	9.83%	0.58%	0.05%	-	1.18%	0.76%	35.30%	47.06%
2017	10,541,189,447	9.81%	0.58%	0.02%	-	0.60%	0.73%	37.81%	48.96%
2018	10,441,324,011	9.00%	0.58%	0.04%	0.02%	0.64%	0.20%	39.22%	49.06%
2019	10,649,695,100	9.00%	0.58%	0.04%	0.02%	0.64%	0.20%	40.88%	50.72%
2020	10,954,583,571	9.00%	0.58%	0.04%	0.03%	0.65%	0.21%	43.94%	53.80%

## Section 5: Projections

### Table 3 – Projection of Contributions to Trust to 2046 (Percent of Payroll) *continued*

Year Ended June 30	Assumed Payroll	Member	Contributions						
			School District			Federal Funds	State	Total	
			§16-158(e) (2.2 Formula)	§16-158(f) (6% FAS Cap)	§16-158(i-5) (Payroll above Gov.)				Total
2021	\$11,214,640,162	9.00%	0.58%	0.04%	0.04%	0.66%	0.21%	45.84%	55.71%
2022	11,470,434,147	9.00%	0.58%	0.04%	0.03%	0.65%	0.21%	49.63%	59.49%
2023	11,816,370,146	9.00%	0.58%	0.04%	0.03%	0.65%	0.20%	49.72%	59.57%
2024	12,165,599,166	9.00%	0.58%	0.04%	0.04%	0.65%	0.20%	49.96%	59.80%
2025	12,518,401,659	9.00%	0.58%	0.04%	0.04%	0.66%	0.19%	50.40%	60.24%
2026	12,860,156,380	9.00%	0.58%	0.04%	0.04%	0.66%	0.18%	50.82%	60.66%
2027	13,202,455,554	9.00%	0.58%	0.04%	0.04%	0.66%	0.17%	50.84%	60.67%
2028	13,539,207,461	9.00%	0.58%	0.04%	0.04%	0.66%	0.17%	50.75%	60.58%
2029	13,883,967,283	9.00%	0.58%	0.04%	0.05%	0.66%	0.16%	50.69%	60.51%
2030	14,234,437,083	9.00%	0.58%	0.04%	0.05%	0.67%	0.15%	50.55%	60.36%
2031	14,595,504,496	9.00%	0.58%	0.04%	0.05%	0.67%	0.14%	50.43%	60.24%
2032	14,958,302,532	9.00%	0.58%	0.04%	0.05%	0.67%	0.13%	50.44%	60.24%
2033	15,323,774,864	9.00%	0.58%	0.04%	0.05%	0.67%	0.12%	50.57%	60.36%
2034	15,693,327,019	9.00%	0.58%	0.04%	0.05%	0.67%	0.11%	55.22%	64.99%
2035	16,074,964,586	9.00%	0.58%	0.04%	0.05%	0.66%	0.10%	55.22%	64.98%
2036	16,471,882,484	9.00%	0.58%	0.04%	0.04%	0.66%	0.09%	55.22%	64.96%
2037	16,888,833,312	9.00%	0.58%	0.04%	0.04%	0.66%	0.08%	55.22%	64.95%
2038	17,321,103,476	9.00%	0.58%	0.04%	0.04%	0.65%	0.07%	55.22%	64.93%
2039	17,762,872,398	9.00%	0.58%	0.04%	0.03%	0.65%	0.05%	55.22%	64.92%
2040	18,218,958,767	9.00%	0.58%	0.03%	0.03%	0.64%	0.04%	55.22%	64.90%
2041	18,694,733,855	9.00%	0.58%	0.03%	0.02%	0.63%	0.03%	55.22%	64.88%
2042	19,192,042,908	9.00%	0.58%	0.03%	0.01%	0.62%	0.02%	55.22%	64.86%
2043	19,704,067,755	9.00%	0.58%	0.03%	0.01%	0.61%	0.01%	55.22%	64.84%
2044	20,230,492,269	9.00%	0.58%	0.02%	0.00%	0.61%	0.00%	55.22%	64.82%
2045	20,776,659,510	9.00%	0.58%	0.02%	0.00%	0.60%	0.00%	55.22%	64.82%
2046	21,347,748,674	9.00%	0.58%	0.02%	0.00%	0.60%	0.00%	5.37%	14.96%

## Section 5: Projections

### **Table 3 – Projection of Contributions to Trust to 2046 (Percent of Payroll)** *continued*

#### **Notes**

- 1) Effective with the 2016 valuation, the member contribution rate is equal to the statutory 9% rate because of the elimination of ERO and the assumption for the members' cost of optional service.
- 2) The table on pages 75 and 76 shows historical contribution rates as reported in prior valuation reports. The amounts are based on the assumptions used for each valuation and are not adjusted retrospectively to reflect actual experience.

## Section 5: Projections

### Table 4 – Projection of Employer Normal Cost and Amortization Amount to 2046

Amounts above the black line are based on prior valuations and amounts below the line are based on the current valuation. See Notes.

Year Ended June 30	Amortization Year	Employer Rate			Amount of Employer Contribution		
		Total	Normal Cost	Amortization	Total	Normal Cost	Amortization
1995	0	6.03%	8.12%	(2.09%)	\$279,364,800	\$376,122,700	(\$96,757,900)
1996	1	7.02%	8.23%	(1.21%)	341,276,242	400,134,055	(58,857,813)
1997	2	8.06%	8.21%	(0.15%)	395,268,984	402,771,457	(7,502,473)
1998	3	9.09%	8.38%	0.71%	478,439,267	441,403,004	37,036,263
1999	4	10.83%	7.84%	2.99%	602,242,600	435,910,961	166,331,639
2000	5	11.66%	8.15%	3.51%	686,383,626	479,928,856	206,454,770
2001	6	12.37%	8.65%	3.72%	775,732,339	542,794,806	232,937,533
2002	7	13.09%	8.84%	4.25%	872,283,104	588,971,933	283,311,171
2003	8	13.55%	8.83%	4.72%	963,858,291	628,536,783	335,321,508
2004	9	14.96%	8.15%	6.81%	1,099,263,906	598,462,925	500,800,981
2005	10	12.84%	8.32%	4.52%	984,584,606	637,971,250	346,613,356
2006	11	7.64%	8.20%	(0.56%)	601,554,735	645,705,698	(44,150,963)
2007	12	10.36%	8.20%	2.16%	822,890,242	650,835,074	172,055,168
2008	13	13.69%	8.22%	5.47%	1,135,126,451	681,651,502	453,474,949
2009	14	17.66%	9.27%	8.39%	1,556,737,268	817,320,366	739,416,902
2010	15	23.96%	9.15%	14.81%	2,217,053,286	846,936,893	1,370,116,393
2011	16	25.70%	8.77%	16.93%	2,488,617,617	849,716,122	1,638,901,495
2012	17	25.49%	8.43%	17.06%	2,547,802,708	842,532,254	1,705,270,454
2013	18	28.63%	8.23%	20.40%	2,843,463,463	817,433,027	2,026,030,436
2014	19	35.99%	7.89%	28.10%	3,592,578,098	787,230,469	2,805,347,629
2015	20	33.58%	8.02%	25.56%	3,497,365,750	835,810,326	2,661,555,424
2016	21	36.64%	9.36%	27.27%	3,883,544,356	992,489,371	2,891,054,985
2017	22	39.12%	8.27%	30.86%	4,124,118,869	871,335,169	3,252,783,700
2018	23	40.02%	10.10%	29.92%	4,178,744,350	1,054,630,171	3,124,114,179
2019	24	41.72%	9.85%	31.87%	4,466,178,109	1,049,301,284	3,416,876,825
2020	25	44.94%	10.66%	34.28%	4,923,519,270	1,167,213,754	3,756,305,516

## Section 5: Projections

**Table 4 – Projection of Employer Normal Cost and Amortization Amount to 2046**  
*continued*

Year Ended June 30	Amortization Year	Employer Rate			Amount of Employer Contribution		
		Total	Normal Cost	Amortization	Total	Normal Cost	Amortization
2021	26	46.71%	10.41%	36.30%	\$5,237,797,987	\$1,167,182,742	\$4,070,615,245
2022	27	50.49%	10.31%	40.18%	5,791,570,673	1,183,129,632	4,608,441,041
2023	28	50.57%	10.11%	40.46%	5,975,246,690	1,194,548,788	4,780,697,902
2024	29	50.80%	9.78%	41.02%	6,180,708,975	1,190,286,503	4,990,422,471
2025	30	51.24%	9.44%	41.81%	6,414,882,054	1,181,326,374	5,233,555,680
2026	31	51.66%	9.09%	42.57%	6,643,401,080	1,168,965,596	5,474,435,484
2027	32	51.67%	8.71%	42.96%	6,821,837,537	1,149,810,026	5,672,027,511
2028	33	51.58%	8.31%	43.27%	6,983,542,300	1,124,984,538	5,858,557,761
2029	34	51.51%	7.89%	43.63%	7,151,931,639	1,095,009,920	6,056,921,719
2030	35	51.36%	7.45%	43.92%	7,311,076,051	1,059,924,668	6,251,151,383
2031	36	51.24%	6.98%	44.26%	7,478,681,816	1,018,597,917	6,460,083,900
2032	37	51.24%	6.49%	44.75%	7,664,928,160	970,620,997	6,694,307,162
2033	38	51.36%	5.98%	45.38%	7,869,576,196	915,906,259	6,953,669,938
2034	39	55.99%	5.45%	50.54%	8,786,750,473	855,081,484	7,931,668,989
2035	40	55.98%	4.91%	51.07%	8,998,298,484	789,347,075	8,208,951,409
2036	41	55.96%	4.37%	51.59%	9,218,099,184	720,643,352	8,497,455,831
2037	42	55.95%	3.83%	52.12%	9,448,935,488	646,554,772	8,802,380,717
2038	43	55.93%	3.26%	52.68%	9,688,184,261	564,026,522	9,124,157,739
2039	44	55.92%	2.66%	53.25%	9,932,129,562	473,098,035	9,459,031,527
2040	45	55.90%	2.07%	53.82%	10,183,793,462	377,442,855	9,806,350,607
2041	46	55.88%	1.50%	54.38%	10,446,057,101	280,280,941	10,165,776,160
2042	47	55.86%	0.97%	54.89%	10,720,312,070	186,690,199	10,533,621,872
2043	48	55.84%	0.51%	55.33%	11,002,790,083	100,069,171	10,902,720,912
2044	49	55.82%	0.12%	55.70%	11,293,408,565	24,067,697	11,269,340,869
2045	50	55.82%	(0.17%)	55.98%	11,596,622,966	(34,357,336)	11,630,980,301
2046	51	5.96%	(0.35%)	6.31%	1,273,235,017	(73,808,532)	1,347,043,549

## Section 5: Projections

### Table 4 – Projection of Employer Normal Cost and Amortization Amount to 2046 *continued*

#### Notes

- 1) Contributions to the Benefit Trust Reserve represent the sum of State and Federal Funds contributions, as well as School District contributions for the 2.2% formula (commencing in 1999). Starting in fiscal year 2019, School District contributions under Sec. 16-158(f) and 16-158(i-5) are included. Sec. 16-158 requires calculations of State contribution amounts.
- 2) The following employer contributions to the Benefit Trust Reserve were taken into account when determining the above schedule, but are not included in this schedule:
  - a) State ERI contributions of \$1,000,000 for fiscal year 2004 and \$1,684,000 for fiscal year 2005, which were made under a separate funding plan. (Beginning in fiscal year 2007, the cost of ERI is part of the 50-year funding plan, and included in this schedule);
  - b) For fiscal years prior to 2019, School District contributions to the Benefit Trust Reserve under Sec. 16-133.2, 16-158(f) and 16-158(i-5), which are shown in Table 2; and
  - c) for FY 1999, additional State funding due to PA 90-0582, and \$9,695,600 in additional State Pensions Fund appropriations. No School District contributions are anticipated under Sec. 16-128(d-10).
- 3) The amortization rate in fiscal years 1995-1997 and 2006 is negative because contributions do not cover normal cost. A negative employer normal cost after 2022 means member contributions are projected to exceed the cost of benefits accruing.
- 4) Employer Rates, Contribution Amounts, and Assumed Payroll shown for fiscal years 1995 – 2022 are based on the June 30, 1993 – June 30, 2020 actuarial valuations and are certified amounts, with the following exceptions. The 2006 amount is the recertified amount and 2007 is the certified amount required per PA 94-0004. The 2011 amount is the originally certified amount, not the recertified amount per PA 96-1511. The 2015 amount is the certified amount; however, PA 98-0674 subsequently lowered state contributions and increased federal contributions. The 2018 and 2019 amounts are the recertified amounts. Items subsequent to 2021 are based on the June 30, 2020 valuation.
- 5) Modified ERO retirements are recognized commencing with the June 30, 2005 actuarial liability, while FY 2006 and FY 2007 Pipeline ERO retirements are first recognized in the June 30, 2006 and 2007 accrued liabilities. ERO was discontinued effective June 30, 2016.
- 6) For calculation purposes, Employer Rates include 15 decimal places. For ease of presentation, only 2 decimal places are shown.



## Section 5: Projections

### **Table 4 – Projection of Employer Normal Cost and Amortization Amount to 2046** *continued*

#### **Notes** *continued*

#### 7) Assumptions and methodology:

- Payroll Growth based on valuation assumptions
- Valuation Interest Rate = 8.00% prior to 1997, 8.50% for 1997 – 2011, 8.0% for 2012 – 2013 and 7.50% for 2013 – 2015 and 7.00% after 2015
- Return on investment equals valuation interest rate
- Assets at cost value prior to 1997, fair value 1997-2008 and 5-year smoothing actuarial value after 2008

## Section 5: Projections

### Table 5 – Projection of Funded Ratio to 2046 by Tier (Total)

Amounts above the black line are based on prior valuations and amounts below the line are based on the current valuation. See Notes.

Year Ended June 30	Contributions	Benefits and Expenses	Fair Value Asset Return	Actuarial Value of Assets	Fair Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	AVA Funded Ratio
1995	\$701,091,321	\$1,108,283,000		\$12,641,865,000	\$12,641,865,000	\$23,980,566,000	\$11,338,701,000	52.7%
1996	763,515,089	1,148,919,000	\$1,573,249,911	13,829,711,000	13,829,711,000	26,141,794,000	12,312,083,000	52.9%
1997	816,031,609	1,186,203,042	3,933,568,433	17,393,108,000	17,393,108,000	26,951,585,000	9,558,477,000	64.5%
1998	919,406,862	1,237,762,773	2,891,134,911	19,965,887,000	19,965,887,000	29,908,241,000	9,942,354,000	66.8%
1999	1,468,611,600	1,314,929,000	2,118,139,400	22,237,709,000	22,237,709,000	33,205,513,000	10,967,804,000	67.0%
2000	1,306,005,626	1,437,474,000	2,375,172,374	24,481,413,000	24,481,413,000	35,886,404,000	11,404,991,000	68.2%
2001	1,419,295,339	1,611,050,000	(974,012,339)	23,315,646,000	23,315,646,000	39,166,697,000	15,851,051,000	59.5%
2002	1,553,434,874	1,809,763,000	(693,032,874)	22,366,285,000	22,366,285,000	43,047,674,000	20,681,389,000	52.0%
2003	1,695,878,742	2,051,953,000	1,114,612,258	23,124,823,000	23,124,823,000	46,933,432,000	23,808,609,000	49.3%
2004	1,867,925,206	2,320,690,844	8,872,671,638	31,544,729,000	31,544,729,000	50,947,451,000	19,402,722,000	61.9%
2005	1,746,374,615	2,604,081,011	3,398,195,396	34,085,218,000	34,085,218,000	56,075,029,000	21,989,811,000	60.8%
2006	1,415,563,852	2,948,023,574	4,032,130,722	36,584,889,000	36,584,889,000	58,996,913,000	22,412,024,000	62.0%
2007	1,828,832,782	3,184,574,659	6,680,170,877	41,909,318,000	41,909,318,000	65,648,395,000	23,739,077,000	63.8%
2008	2,083,663,689	3,498,960,895	(2,063,297,794)	38,430,723,000	38,430,723,000	68,632,367,000	30,201,644,000	56.0%
2009	2,530,238,820	3,723,108,308	(8,706,541,270)	38,026,043,512	28,531,312,242	73,027,198,000	35,001,154,488	52.1%
2010	3,218,908,199	4,003,538,821	3,577,102,594	37,439,091,771	31,323,784,214	77,293,198,000	39,854,106,229	48.4%
2011	3,528,480,558	4,329,807,307	6,948,809,729	37,769,752,971	37,471,267,194	81,299,745,000	43,529,992,029	46.5%
2012	3,613,936,264	4,641,424,675	73,046,556	37,945,397,211	36,516,825,339	90,024,945,000	52,079,547,789	42.1%
2013	3,886,866,763	4,969,794,354	4,424,870,751	38,155,191,497	39,858,768,499	93,886,988,785	55,731,797,288	40.6%
2014	4,524,563,343	5,340,981,048	6,782,031,720	42,150,765,261	45,824,382,514	103,740,377,267	61,589,612,006	40.6%
2015	4,457,907,579	5,645,924,033	1,770,549,533	45,435,192,645	46,406,915,593	108,121,825,171	62,686,632,526	42.0%
2016	4,842,319,410	5,954,175,094	(44,103,178)	47,222,097,809	45,250,956,731	118,629,890,305	71,407,792,496	39.8%
2017	5,064,989,441	6,460,734,655	5,520,453,001	49,467,525,209	49,375,664,518	122,904,034,268	73,436,509,059	40.2%
2018	5,117,795,720	6,573,185,272	4,049,271,728	51,730,889,960	51,969,546,694	127,019,330,164	75,288,440,204	40.7%
2019	5,518,507,593	6,843,096,252	2,617,531,332	53,391,192,733	53,262,489,367	131,456,968,953	78,065,776,220	40.6%
2020	5,900,510,333	7,122,491,327	275,969,398	54,890,975,829	52,316,477,771	135,598,547,013	80,707,571,184	40.5%

## Section 5: Projections

### Table 5 – Projection of Funded Ratio to 2046 by Tier (Total) *continued*

Year Ended June 30	Contributions	Benefits and Expenses	Fair Value Asset Return	Actuarial Value of Assets	Fair Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	AVA Funded Ratio
2021	\$6,247,115,602	\$7,476,643,962	\$248,718,130	\$57,012,891,041	\$54,706,069,362	\$139,358,761,207	\$82,345,870,166	40.9%
2022	6,823,909,746	7,757,112,884	3,796,762,746	59,128,426,847	57,569,628,970	143,162,786,496	84,034,359,650	41.3%
2023	7,038,720,003	8,035,673,860	3,994,980,643	61,249,647,061	60,567,655,757	147,201,689,302	85,952,042,240	41.6%
2024	7,275,612,900	8,318,521,544	4,203,234,100	63,727,981,213	63,727,981,213	151,258,656,487	87,530,675,274	42.1%
2025	7,541,538,204	8,614,992,025	4,423,387,801	67,077,915,193	67,077,915,193	155,316,328,757	88,238,413,565	43.2%
2026	7,800,815,154	8,919,426,030	4,656,302,683	70,615,607,000	70,615,607,000	159,361,969,607	88,746,362,606	44.3%
2027	8,010,058,537	9,238,063,590	4,900,112,313	74,287,714,260	74,287,714,260	163,373,062,247	89,085,347,987	45.5%
2028	8,202,070,971	9,566,035,926	5,152,401,225	78,076,150,530	78,076,150,530	167,331,148,998	89,254,998,468	46.7%
2029	8,401,488,694	9,901,919,375	5,412,815,463	81,988,535,313	81,988,535,313	171,219,753,306	89,231,217,993	47.9%
2030	8,592,175,389	10,247,994,328	5,681,243,809	86,013,960,182	86,013,960,182	175,018,711,038	89,004,750,856	49.1%
2031	8,792,277,221	10,603,558,908	5,957,582,354	90,160,260,848	90,160,260,848	178,706,458,688	88,546,197,839	50.5%
2032	9,011,175,387	10,967,291,059	6,242,754,211	94,446,899,388	94,446,899,388	182,260,044,092	87,813,144,704	51.8%
2033	9,248,715,934	11,341,288,740	6,538,042,909	98,892,369,491	98,892,369,491	185,652,734,238	86,760,364,747	53.3%
2034	10,199,149,905	11,717,777,513	6,869,313,898	104,243,055,781	104,243,055,781	188,864,751,140	84,621,695,359	55.2%
2035	10,445,045,297	12,097,228,642	7,239,187,488	109,830,059,924	109,830,059,924	191,876,430,493	82,046,370,569	57.2%
2036	10,700,568,607	12,471,658,741	7,626,116,040	115,685,085,830	115,685,085,830	194,677,297,507	78,992,211,677	59.4%
2037	10,968,930,487	12,844,015,561	8,032,328,030	121,842,328,785	121,842,328,785	197,251,038,226	75,408,709,440	61.8%
2038	11,247,083,574	13,221,549,397	8,459,856,711	128,327,719,673	128,327,719,673	199,569,095,958	71,241,376,285	64.3%
2039	11,530,788,078	13,589,576,123	8,910,882,796	135,179,814,423	135,179,814,423	201,615,612,289	66,435,797,865	67.0%
2040	11,823,499,751	13,946,896,956	9,388,268,107	142,444,685,326	142,444,685,326	203,379,105,591	60,934,420,265	70.0%
2041	12,128,583,148	14,262,176,400	9,896,452,209	150,207,544,283	150,207,544,283	204,883,551,393	54,676,007,110	73.3%
2042	12,447,595,932	14,568,767,407	10,440,287,098	158,526,659,906	158,526,659,906	206,125,504,525	47,598,844,619	76.9%
2043	12,776,156,181	14,837,023,019	11,024,735,854	167,490,528,922	167,490,528,922	207,134,842,310	39,644,313,388	80.9%
2044	13,114,152,869	15,054,170,719	11,656,436,400	177,206,947,472	177,206,947,472	207,960,496,887	30,753,549,415	85.2%
2045	13,466,522,322	15,221,206,334	12,343,072,383	187,795,335,843	187,795,335,843	208,661,484,270	20,866,148,427	90.0%
2046	3,194,532,397	15,336,155,338	12,720,716,706	188,374,429,608	188,374,429,608	209,304,921,787	20,930,492,179	90.0%

## Section 5: Projections

### Table 5 – Projection of Funded Ratio to 2046 by Tier (Tier I Only)

Year Ended June 30	Contributions	Benefits and Expenses	Fair Value Asset Return	Actuarial Value of Assets	Fair Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	AVA Funded Ratio
2014				\$42,060,460,784	\$45,726,207,620	\$103,665,420,423	\$61,604,959,639	40.6%
2015	\$4,357,376,533	\$5,636,978,805	\$1,759,751,948	45,238,833,875	46,206,357,296	108,001,248,291	62,762,414,416	41.9%
2016	4,761,135,081	5,938,766,822	(43,878,630)	46,944,396,204	44,984,846,925	118,449,453,398	71,505,057,193	39.6%
2017	4,964,338,090	6,438,142,918	5,482,643,972	49,084,836,109	48,993,686,068	122,638,280,909	73,553,444,799	40.0%
2018	4,994,858,498	6,547,670,601	4,013,422,755	51,218,006,139	51,454,296,720	126,627,563,072	75,409,556,933	40.4%
2019	5,369,865,536	6,811,987,553	2,588,547,964	52,727,529,954	52,600,722,667	130,924,874,572	78,197,344,618	40.3%
2020	5,723,556,341	7,086,035,686	271,835,207	54,044,893,615	51,510,078,528	134,899,448,680	80,854,555,064	40.1%
2021	6,036,877,830	7,435,264,576	3,556,761,961	55,931,521,699	53,668,453,743	138,469,096,406	82,537,574,707	40.4%
2022	6,575,515,492	7,707,018,190	3,717,189,168	57,777,318,943	56,254,140,214	142,042,567,464	84,265,248,521	40.7%
2023	6,750,821,746	7,978,398,209	3,894,824,639	59,584,842,737	58,921,388,389	145,806,714,691	86,221,871,954	40.9%
2024	6,946,566,474	8,254,284,660	4,078,727,051	61,692,397,254	61,692,397,254	149,539,751,364	87,847,354,110	41.3%
2025	7,169,551,847	8,540,067,080	4,270,499,775	64,592,381,795	64,592,381,795	153,223,852,384	88,631,470,589	42.2%
2026	7,384,624,651	8,836,824,420	4,470,639,734	67,610,821,760	67,610,821,760	156,837,167,454	89,226,345,694	43.1%
2027	7,546,813,278	9,147,074,824	4,676,748,369	70,687,308,583	70,687,308,583	160,351,276,216	89,663,967,634	44.1%
2028	7,688,310,402	9,465,983,633	4,885,893,038	73,795,528,390	73,795,528,390	163,740,510,248	89,944,981,858	45.1%
2029	7,834,313,895	9,792,036,610	5,097,166,692	76,934,972,366	76,934,972,366	166,981,446,853	90,046,474,486	46.1%
2030	7,968,759,377	10,125,624,129	5,309,957,799	80,088,065,413	80,088,065,413	170,048,204,563	89,960,139,150	47.1%
2031	8,108,897,765	10,469,763,991	5,523,534,261	83,250,733,448	83,250,733,448	172,908,953,976	89,658,220,527	48.1%
2032	8,264,660,068	10,821,345,346	5,738,067,357	86,432,115,527	86,432,115,527	175,531,707,721	89,099,592,195	49.2%
2033	8,435,618,132	11,182,274,260	5,954,115,122	89,639,574,520	89,639,574,520	177,879,895,482	88,240,320,962	50.4%
2034	9,315,766,994	11,544,204,864	6,196,774,891	93,607,911,541	93,607,911,541	179,924,027,263	86,316,115,722	52.0%
2035	9,488,108,700	11,907,797,798	6,467,864,689	97,656,087,133	97,656,087,133	181,633,849,376	83,977,762,243	53.8%
2036	9,666,821,481	12,264,774,699	6,744,997,737	101,803,131,652	101,803,131,652	182,987,975,421	81,184,843,769	55.6%
2037	9,855,779,893	12,618,185,320	7,029,535,026	106,070,261,251	106,070,261,251	183,958,845,729	77,888,584,479	57.7%
2038	10,051,129,252	12,974,952,953	7,322,584,458	110,469,022,008	110,469,022,008	184,505,697,972	74,036,675,964	59.9%
2039	10,248,567,472	13,320,075,933	7,625,328,744	115,022,842,292	115,022,842,292	184,599,986,580	69,577,144,288	62.3%
2040	10,453,029,454	13,653,409,196	7,939,585,669	119,762,048,219	119,762,048,219	184,215,288,181	64,453,239,963	65.0%
2041	10,668,474,789	13,941,324,876	8,268,793,622	124,757,991,755	124,757,991,755	183,363,463,010	58,605,471,255	68.0%
2042	10,898,146,507	14,219,556,461	8,616,810,074	130,053,391,875	130,053,391,875	182,026,441,808	51,973,049,933	71.4%
2043	11,139,391,557	14,456,773,639	8,987,629,058	135,723,638,851	135,723,638,851	180,220,837,031	44,497,198,180	75.3%
2044	11,392,906,445	14,639,721,010	9,387,016,210	141,863,840,495	141,863,840,495	177,982,491,552	36,118,651,056	79.7%
2045	11,664,530,792	14,768,444,683	9,821,831,848	148,581,758,453	148,581,758,453	175,357,721,334	26,775,962,881	84.7%
2046	1,317,843,760	14,838,471,487	9,927,501,121	144,988,631,847	144,988,631,847	172,405,242,515	27,416,610,668	84.1%

## Section 5: Projections

### Table 5 – Projection of Funded Ratio to 2046 by Tier (Tier II Only)

Year Ended June 30	Contributions	Benefits and Expenses	Fair Value Asset Return	Actuarial Value of Assets	Fair Value of Assets	Actuarial Accrued Liability	Unfunded Actuarial Accrued Liability	AVA Funded Ratio
2014				\$90,304,477	\$98,174,894	\$74,956,844	(\$15,347,633)	120.5%
2015	\$100,531,046	\$8,945,228	\$10,797,585	196,358,770	200,558,297	120,576,880	(75,781,890)	162.8%
2016	81,184,329	15,408,272	(224,548)	277,701,605	266,109,806	180,436,907	(97,264,698)	153.9%
2017	100,651,351	22,591,737	37,809,030	382,689,100	381,978,450	265,753,359	(116,935,740)	144.0%
2018	122,937,222	25,514,671	35,848,973	512,883,821	515,249,974	391,767,092	(121,116,729)	130.9%
2019	148,642,057	31,108,699	29,283,368	663,662,779	662,066,700	532,094,381	(131,568,398)	124.7%
2020	176,953,992	36,455,641	3,834,191	846,082,214	806,399,243	699,098,333	(146,983,881)	121.0%
2021	210,237,771	41,379,386	62,357,990	1,081,369,342	1,037,615,619	889,664,802	(191,704,540)	121.5%
2022	248,394,254	50,094,694	79,573,578	1,351,107,903	1,315,488,756	1,120,219,032	(230,888,871)	120.6%
2023	287,898,257	57,275,650	100,156,004	1,664,804,325	1,646,267,368	1,394,974,611	(269,829,714)	119.3%
2024	329,046,425	64,236,883	124,507,050	2,035,583,959	2,035,583,959	1,718,905,123	(316,678,837)	118.4%
2025	371,986,357	74,924,944	152,888,027	2,485,533,398	2,485,533,398	2,092,476,373	(393,057,024)	118.8%
2026	416,190,503	82,601,610	185,662,949	3,004,785,240	3,004,785,240	2,524,802,153	(479,983,088)	119.0%
2027	463,245,259	90,988,766	223,363,944	3,600,405,678	3,600,405,678	3,021,786,031	(578,619,647)	119.1%
2028	513,760,569	100,052,293	266,508,187	4,280,622,140	4,280,622,140	3,590,638,750	(689,983,390)	119.2%
2029	567,174,800	109,882,765	315,648,771	5,053,562,947	5,053,562,947	4,238,306,453	(815,256,493)	119.2%
2030	623,416,012	122,370,199	371,286,010	5,925,894,769	5,925,894,769	4,970,506,475	(955,388,294)	119.2%
2031	683,379,456	133,794,918	434,048,093	6,909,527,400	6,909,527,400	5,797,504,712	(1,112,022,688)	119.2%
2032	746,515,320	145,945,713	504,686,854	8,014,783,862	8,014,783,862	6,728,336,370	(1,286,447,491)	119.1%
2033	813,097,803	159,014,480	583,927,787	9,252,794,971	9,252,794,971	7,772,838,756	(1,479,956,215)	119.0%
2034	883,382,911	173,572,648	672,539,007	10,635,144,241	10,635,144,241	8,940,723,878	(1,694,420,363)	119.0%
2035	956,936,597	189,430,844	771,322,798	12,173,972,791	12,173,972,791	10,242,581,117	(1,931,391,674)	118.9%
2036	1,033,747,126	206,884,043	881,118,303	13,881,954,178	13,881,954,178	11,689,322,086	(2,192,632,092)	118.8%
2037	1,113,150,593	225,830,241	1,002,793,005	15,772,067,535	15,772,067,535	13,292,192,496	(2,479,875,038)	118.7%
2038	1,195,954,322	246,596,445	1,137,272,253	17,858,697,665	17,858,697,665	15,063,397,986	(2,795,299,679)	118.6%
2039	1,282,220,606	269,500,191	1,285,554,051	20,156,972,132	20,156,972,132	17,015,625,709	(3,141,346,423)	118.5%
2040	1,370,470,297	293,487,760	1,448,682,438	22,682,637,107	22,682,637,107	19,163,817,409	(3,518,819,698)	118.4%
2041	1,460,108,359	320,851,525	1,627,658,587	25,449,552,528	25,449,552,528	21,520,088,383	(3,929,464,145)	118.3%
2042	1,549,449,425	349,210,946	1,823,477,024	28,473,268,031	28,473,268,031	24,099,062,717	(4,374,205,314)	118.2%
2043	1,636,764,625	380,249,380	2,037,106,796	31,766,890,071	31,766,890,071	26,914,005,279	(4,852,884,792)	118.0%
2044	1,721,246,424	414,449,709	2,269,420,190	35,343,106,977	35,343,106,977	29,978,005,335	(5,365,101,641)	117.9%
2045	1,801,991,530	452,761,651	2,521,240,534	39,213,577,390	39,213,577,390	33,303,762,936	(5,909,814,454)	117.7%
2046	1,876,688,638	497,683,851	2,793,215,585	43,385,797,761	43,385,797,761	36,899,679,272	(6,486,118,490)	117.6%

## Section 5: Projections

### Table 5 – Projection of Funded Ratio to 2046 by Tier *continued*

#### Notes

- 1) The projection of assets is based upon the assumption that the Employer maintains the funding policy under Public Act 94-0004 that begins with fiscal year 2006, as revised by Public Act 100-0023 effective with fiscal year 2018.
- 2) Projected amounts may not add to the dollar due to rounding.
- 3) Projected buyout amounts are excluded from both the contributions and benefit payments.
- 4) For 2001 to 2008, actuarial value of assets are equal to the fair value; for 2009 and after, assets are 5-year smoothed value.

## Section 5: Projections

### Table 6 – Projection of Actuarial Accrued Liability to 2046 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Inactive	Total Actuarial Accrued Liability
2020	\$43,280,374,958	\$699,098,333	-	\$91,619,073,722	\$135,598,547,013
2021	48,173,998,854	859,780,719	\$29,884,083	90,295,097,552	139,358,761,207
2022	53,185,883,268	1,031,370,785	88,848,247	88,856,684,196	143,162,786,496
2023	58,318,309,009	1,218,584,930	176,389,680	87,488,405,682	147,201,689,302
2024	63,601,432,515	1,426,716,486	292,188,636	85,938,318,849	151,258,656,487
2025	69,020,076,979	1,656,699,939	435,776,434	84,203,775,405	155,316,328,757
2026	74,550,595,810	1,908,779,835	616,022,318	82,286,571,644	159,361,969,607
2027	80,160,013,649	2,185,278,936	836,507,095	80,191,262,567	163,373,062,247
2028	85,816,667,067	2,488,806,006	1,101,832,744	77,923,843,181	167,331,148,998
2029	91,492,285,406	2,821,763,044	1,416,543,410	75,489,161,447	171,219,753,306
2030	97,152,678,520	3,184,780,005	1,785,726,469	72,895,526,043	175,018,711,038
2031	102,756,244,879	3,579,229,712	2,218,275,000	70,152,709,097	178,706,458,688
2032	108,258,596,844	4,006,946,742	2,721,389,629	67,273,110,877	182,260,044,092
2033	113,610,403,995	4,469,861,388	3,302,977,368	64,269,491,487	185,652,734,238
2034	118,763,010,411	4,969,839,565	3,970,884,312	61,161,016,852	188,864,751,140
2035	123,669,071,137	5,508,389,729	4,734,191,388	57,964,778,239	191,876,430,493
2036	128,286,711,044	6,087,232,378	5,602,089,708	54,701,264,378	194,677,297,507
2037	132,567,624,953	6,707,708,551	6,584,483,945	51,391,220,776	197,251,038,226
2038	136,449,271,514	7,370,720,436	7,692,677,551	48,056,426,458	199,569,095,958
2039	139,880,352,142	8,077,747,827	8,937,877,882	44,719,634,438	201,615,612,289
2040	142,813,260,935	8,830,078,318	10,333,739,092	41,402,027,246	203,379,105,591
2041	145,216,547,636	9,628,688,752	11,891,399,631	38,146,915,374	204,883,551,393
2042	147,072,257,581	10,475,076,108	13,623,986,609	34,954,184,227	206,125,504,525
2043	148,375,445,146	11,368,762,330	15,545,242,950	31,845,391,884	207,134,842,310
2044	149,143,698,194	12,308,893,650	17,669,111,686	28,838,793,358	207,960,496,887
2045	149,408,729,091	13,291,701,693	20,012,061,243	25,948,992,243	208,661,484,270
2046	149,216,365,790	14,313,360,551	22,586,318,721	23,188,876,725	209,304,921,787

## Section 5: Projections

### Table 7 – Projection of Total Normal Cost to 2046 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Total Normal Cost
2020	\$1,976,126,733	\$141,732,200	-	\$2,117,858,933
2021	1,968,325,127	141,744,603	\$30,073,271	2,140,143,001
2022	1,971,501,611	143,097,418	59,977,442	2,174,576,470
2023	1,980,054,540	145,916,656	89,925,405	2,215,896,600
2024	1,971,677,825	150,140,957	120,001,140	2,241,819,922
2025	1,958,131,177	155,153,547	150,069,547	2,263,354,271
2026	1,937,839,459	160,659,432	182,034,168	2,280,533,058
2027	1,908,469,572	166,434,593	216,059,948	2,290,964,113
2028	1,869,813,520	172,694,211	252,738,042	2,295,245,773
2029	1,824,194,966	179,225,193	291,650,306	2,295,070,466
2030	1,771,217,691	186,147,452	332,912,923	2,290,278,067
2031	1,709,920,074	193,509,547	376,730,551	2,280,160,173
2032	1,639,199,928	201,185,111	423,156,658	2,263,541,697
2033	1,558,705,838	209,197,537	472,513,181	2,240,416,556
2034	1,469,412,428	217,493,660	524,627,928	2,211,534,016
2035	1,373,193,373	225,968,064	579,625,010	2,178,786,447
2036	1,272,374,684	234,665,587	637,350,046	2,144,390,318
2037	1,165,443,058	243,425,949	697,471,869	2,106,340,877
2038	1,048,473,824	252,029,525	760,672,545	2,061,175,893
2039	921,048,564	260,588,851	826,794,283	2,008,431,698
2040	786,931,799	269,173,038	896,093,501	1,952,198,338
2041	651,234,867	277,593,854	967,331,317	1,896,160,038
2042	519,905,198	285,888,575	1,039,760,425	1,845,554,197
2043	396,303,120	293,656,601	1,113,230,310	1,803,190,032
2044	284,603,716	300,606,341	1,187,479,996	1,772,690,053
2045	192,501,836	306,320,776	1,262,650,369	1,761,472,980
2046	124,267,540	310,407,970	1,336,708,359	1,771,383,869

Note: The normal cost in this table does not include administrative expenses.



## Section 5: Projections

### Table 8 – Projection of Benefit Payments to 2046 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Inactive	Total Benefit Payments	Administrative Expenses	Total Benefits and Expenses
2020	\$119,928,280	\$32,368,765	-	\$7,007,546,364	\$7,159,843,409	\$22,966,372	\$7,182,809,781
2021	273,449,220	33,615,842	\$1,165,370	7,136,973,982	7,445,204,414	31,439,548	7,476,643,962
2022	438,041,756	35,295,696	4,959,793	7,237,923,404	7,716,220,649	40,892,235	7,757,112,884
2023	616,037,675	34,621,106	11,250,536	7,331,639,041	7,993,548,358	42,125,501	8,035,673,859
2024	809,189,415	31,292,345	19,910,600	7,414,758,677	8,275,151,037	43,370,507	8,318,521,543
2025	1,022,032,837	29,262,789	30,927,313	7,488,140,832	8,570,363,771	44,628,252	8,614,992,023
2026	1,260,151,516	28,967,594	37,148,192	7,547,312,115	8,873,579,417	45,846,612	8,919,426,028
2027	1,528,629,042	28,191,597	44,447,448	7,589,728,589	9,190,996,676	47,066,912	9,238,063,589
2028	1,823,759,871	27,030,500	52,671,098	7,614,307,020	9,517,768,489	48,267,437	9,566,035,926
2029	2,142,445,483	25,647,663	61,768,602	7,622,561,117	9,852,422,865	49,496,510	9,901,919,375
2030	2,488,097,397	26,037,435	71,638,480	7,611,475,077	10,197,248,389	50,745,939	10,247,994,328
2031	2,864,603,474	27,573,181	79,152,226	7,580,196,879	10,551,525,760	52,033,148	10,603,558,908
2032	3,270,741,049	29,775,384	86,599,928	7,526,848,170	10,913,964,531	53,326,528	10,967,291,058
2033	3,707,932,682	32,699,010	94,107,654	7,451,919,953	11,286,659,299	54,629,441	11,341,288,740
2034	4,173,163,833	36,483,708	102,097,044	7,350,086,028	11,661,830,613	55,946,899	11,717,777,512
2035	4,663,748,663	41,495,751	110,029,644	7,224,647,142	12,039,921,200	57,307,441	12,097,228,642
2036	5,173,523,595	47,677,073	118,258,960	7,073,476,655	12,412,936,283	58,722,458	12,471,658,741
2037	5,704,357,526	55,350,568	126,386,393	6,897,712,181	12,783,806,668	60,208,893	12,844,015,561
2038	6,262,818,015	64,811,571	134,411,635	6,697,758,235	13,159,799,456	61,749,941	13,221,549,397
2039	6,833,394,697	75,675,434	143,034,403	6,474,146,736	13,526,251,270	63,324,853	13,589,576,123
2040	7,412,810,509	88,296,971	150,904,755	6,229,933,915	13,881,946,150	64,950,806	13,946,896,956
2041	7,987,341,900	102,875,491	160,139,325	5,945,172,734	14,195,529,450	66,646,950	14,262,176,400
2042	8,547,763,211	119,011,750	168,823,576	5,664,749,007	14,500,347,544	68,419,863	14,568,767,407
2043	9,083,647,478	138,315,095	177,100,002	5,367,715,207	14,766,777,782	70,245,238	14,837,023,019
2044	9,577,059,043	160,824,943	185,444,053	5,058,720,732	14,982,048,771	72,121,947	15,054,170,719
2045	10,023,226,605	188,883,054	192,499,470	4,742,528,165	15,147,137,294	74,069,040	15,221,206,334
2046	10,414,921,895	221,898,665	201,447,214	4,421,782,584	15,260,050,358	76,104,980	15,336,155,338

Note: The projected benefit payments shown above do not include projected buyout amounts of \$246,890,200 and \$171,737,531 for the years ending June 30, 2021 and 2022, respectively.

## Section 5: Projections

### Table 9 – Projection of Payroll to 2046 by Member Group

Year Ended June 30	Tier I Current Active	Tier II Current Active	New Entrants	Total Normal Cost
2020	\$8,882,888,876	\$1,922,893,786	-	\$10,805,782,662
2021	8,794,681,602	1,921,510,133	\$414,465,105	11,130,656,840
2022	8,710,497,992	1,926,327,202	833,608,953	11,470,434,147
2023	8,617,500,622	1,939,831,346	1,259,038,178	11,816,370,146
2024	8,509,527,774	1,962,983,305	1,693,088,087	12,165,599,166
2025	8,385,219,920	1,999,006,293	2,134,175,446	12,518,401,659
2026	8,235,817,456	2,040,166,117	2,584,172,807	12,860,156,380
2027	8,055,286,005	2,082,726,502	3,064,443,047	13,202,455,554
2028	7,830,756,697	2,125,398,324	3,583,052,440	13,539,207,461
2029	7,582,025,064	2,168,459,490	4,133,482,729	13,883,967,283
2030	7,307,592,509	2,209,897,915	4,716,946,659	14,234,437,083
2031	7,002,399,431	2,250,732,916	5,342,372,149	14,595,504,496
2032	6,663,687,866	2,291,211,019	6,003,403,647	14,958,302,532
2033	6,289,354,836	2,329,002,696	6,705,417,332	15,323,774,864
2034	5,877,961,346	2,363,518,045	7,451,847,628	15,693,327,019
2035	5,442,335,735	2,394,510,552	8,238,118,299	16,074,964,586
2036	4,985,803,303	2,421,922,335	9,064,156,846	16,471,882,484
2037	4,520,493,388	2,445,503,575	9,922,836,349	16,888,833,312
2038	4,032,722,120	2,464,438,437	10,823,942,919	17,321,103,476
2039	3,515,976,775	2,476,233,230	11,770,662,393	17,762,872,398
2040	2,991,511,021	2,481,189,979	12,746,257,767	18,218,958,767
2041	2,471,307,646	2,481,835,035	13,741,591,174	18,694,733,855
2042	1,975,938,183	2,476,555,231	14,739,549,494	19,192,042,908
2043	1,517,794,149	2,464,214,539	15,722,059,067	19,704,067,755
2044	1,105,532,000	2,441,780,928	16,683,179,341	20,230,492,269
2045	754,531,403	2,409,754,233	17,612,373,874	20,776,659,510
2046	495,652,701	2,365,847,323	18,486,248,650	21,347,748,674

## Section 5: Projections

### Table 10 – Projection of Member Count to 2046 by Member Group

Year Ended June 30	Tier I			Tier II			Total		Grand Total
	Number Active	Number Retired and Inactive	Subtotal	Number Active	Number Retired and Inactive	Subtotal	Number Active	Number Retired and Inactive	
2020	109,400	233,027	342,427	53,675	23,844	77,519	163,075	256,871	419,946
2021	103,330	230,186	333,516	59,745	22,678	82,423	163,075	252,864	415,939
2022	97,717	227,186	324,903	65,358	21,528	86,886	163,075	248,714	411,789
2023	92,428	224,079	316,507	70,647	20,471	91,118	163,075	244,550	407,625
2024	87,420	220,856	308,276	75,655	19,520	95,175	163,075	240,375	403,450
2025	82,634	217,636	300,270	80,441	18,665	99,106	163,075	236,301	399,376
2026	77,921	214,214	292,135	85,154	17,871	103,025	163,075	232,086	395,161
2027	73,130	210,739	283,869	89,945	17,162	107,107	163,075	227,901	390,976
2028	68,394	207,069	275,463	94,681	16,541	111,222	163,075	223,610	386,685
2029	63,715	203,199	266,914	99,360	16,013	115,373	163,075	219,211	382,286
2030	59,026	199,194	258,220	104,049	15,767	119,816	163,075	214,961	378,036
2031	54,340	195,044	249,384	108,735	15,553	124,288	163,075	210,598	373,673
2032	49,665	190,749	240,414	113,410	15,441	128,851	163,075	206,190	369,265
2033	44,995	186,319	231,314	118,080	15,427	133,507	163,075	201,746	364,821
2034	40,403	181,694	222,097	122,672	15,530	138,202	163,075	197,223	360,298
2035	35,920	176,847	212,767	127,155	15,722	142,877	163,075	192,569	355,644
2036	31,616	171,720	203,336	131,459	16,004	147,463	163,075	187,725	350,800
2037	27,389	166,431	193,820	135,686	16,376	152,062	163,075	182,807	345,882
2038	23,209	161,018	184,227	139,866	16,854	156,720	163,075	177,872	340,947
2039	19,188	155,393	174,581	143,887	17,443	161,330	163,075	172,835	335,910
2040	15,399	149,491	164,890	147,676	18,089	165,765	163,075	167,580	330,655
2041	11,976	148,108	160,084	151,099	20,064	171,163	163,075	168,172	331,247
2042	8,956	146,318	155,274	154,119	22,137	176,256	163,075	168,455	331,530
2043	6,359	144,123	150,482	156,716	24,314	181,030	163,075	168,437	331,512
2044	4,233	141,491	145,724	158,842	26,599	185,441	163,075	168,090	331,165
2045	2,709	138,307	141,016	160,366	28,980	189,346	163,075	167,287	330,362
2046	1,675	134,696	136,371	161,400	31,533	192,933	163,075	166,229	329,304

## Section 5: Projections

### Table 11 – Projection of Employer Normal Cost to 2046 by Member Group

Year Ended June 30	Payroll			Employer Normal Cost (\$)				Employer Normal Cost (% of Pay)			
	Tier I	Tier II	Total	Tier I	Tier II	Admin. Expenses	Total	Tier I (% of pay)	Tier II (% of pay)	Admin. Expenses (% of pay)	Total (% of pay)
2022	\$8,710,497,992	\$2,759,936,155	\$11,470,434,147	\$1,187,556,791	(\$45,319,394)	\$40,892,235	\$1,183,129,632	13.63%	(1.64%)	0.36%	10.31%
2023	8,617,500,622	3,198,869,524	11,816,370,146	1,204,479,484	(52,056,197)	42,125,501	1,194,548,788	13.98%	(1.63%)	0.36%	10.11%
2024	8,509,527,774	3,656,071,392	12,165,599,166	1,205,820,325	(58,904,328)	43,370,507	1,190,286,503	14.17%	(1.61%)	0.36%	9.78%
2025	8,385,219,920	4,133,181,739	12,518,401,659	1,203,461,385	(66,763,263)	44,628,252	1,181,326,374	14.35%	(1.62%)	0.36%	9.44%
2026	8,235,817,456	4,624,338,924	12,860,156,380	1,196,615,888	(73,496,904)	45,846,612	1,168,965,596	14.53%	(1.59%)	0.36%	9.09%
2027	8,055,286,005	5,147,169,549	13,202,455,554	1,183,493,832	(80,750,718)	47,066,912	1,149,810,026	14.69%	(1.57%)	0.36%	8.71%
2028	7,830,756,697	5,708,450,764	13,539,207,461	1,165,045,417	(88,328,316)	48,267,437	1,124,984,538	14.88%	(1.55%)	0.36%	8.31%
2029	7,582,025,064	6,301,942,219	13,883,967,283	1,141,812,711	(96,299,301)	49,496,510	1,095,009,920	15.06%	(1.53%)	0.36%	7.89%
2030	7,307,592,509	6,926,844,574	14,234,437,083	1,113,534,366	(104,355,636)	50,745,939	1,059,924,668	15.24%	(1.51%)	0.36%	7.45%
2031	7,002,399,431	7,593,105,065	14,595,504,496	1,079,704,125	(113,139,357)	52,033,148	1,018,597,917	15.42%	(1.49%)	0.36%	6.98%
2032	6,663,687,866	8,294,614,666	14,958,302,532	1,039,468,020	(122,173,550)	53,326,528	970,620,997	15.60%	(1.47%)	0.36%	6.49%
2033	6,289,354,836	9,034,420,028	15,323,774,864	992,663,903	(131,387,085)	54,629,441	915,906,259	15.78%	(1.45%)	0.36%	5.98%
2034	5,877,961,346	9,815,365,673	15,693,327,019	940,395,907	(141,261,322)	55,946,899	855,081,484	16.00%	(1.44%)	0.36%	5.45%
2035	5,442,335,735	10,632,628,851	16,074,964,586	883,383,157	(151,343,523)	57,307,441	789,347,075	16.23%	(1.42%)	0.36%	4.91%
2036	4,985,803,303	11,486,079,181	16,471,882,484	823,652,387	(161,731,493)	58,722,458	720,643,352	16.52%	(1.41%)	0.36%	4.37%
2037	4,520,493,388	12,368,339,924	16,888,833,312	758,598,653	(172,252,775)	60,208,893	646,554,772	16.78%	(1.39%)	0.36%	3.83%
2038	4,032,722,120	13,288,381,356	17,321,103,476	685,528,833	(183,252,252)	61,749,941	564,026,522	17.00%	(1.38%)	0.36%	3.26%
2039	3,515,976,775	14,246,895,623	17,762,872,398	604,610,654	(194,837,472)	63,324,853	473,098,035	17.20%	(1.37%)	0.36%	2.66%
2040	2,991,511,021	15,227,447,746	18,218,958,767	517,695,807	(205,203,758)	64,950,806	377,442,855	17.31%	(1.35%)	0.36%	2.07%
2041	2,471,307,646	16,223,426,209	18,694,733,855	428,817,179	(215,183,188)	66,646,950	280,280,941	17.35%	(1.33%)	0.36%	1.50%
2042	1,975,938,183	17,216,104,725	19,192,042,908	342,070,762	(223,800,426)	68,419,863	186,690,199	17.31%	(1.30%)	0.36%	0.97%
2043	1,517,794,149	18,186,273,606	19,704,067,755	259,701,646	(229,877,713)	70,245,238	100,069,171	17.11%	(1.26%)	0.36%	0.51%
2044	1,105,532,000	19,124,960,269	20,230,492,269	185,105,836	(233,160,087)	72,121,947	24,067,697	16.74%	(1.22%)	0.36%	0.12%
2045	754,531,403	20,022,128,107	20,776,659,510	124,594,010	(233,020,385)	74,069,040	(34,357,336)	16.51%	(1.16%)	0.36%	(0.17%)
2046	495,652,701	20,852,095,973	21,347,748,674	79,658,797	(229,572,309)	76,104,980	(73,808,532)	16.07%	(1.10%)	0.36%	(0.35%)

## Section 5: Projections

### Table 12 – Projection of Debt Service to 2033

Fiscal Year	Debt Service
2020	\$399,198,690
2021	422,197,518
2022	443,731,640
2023	463,801,058
2024	497,200,770
2025	528,003,960
2026	541,748,515
2027	553,983,980
2028	579,505,355
2029	602,763,095
2030	638,552,200
2031	671,323,125
2032	686,280,870
2033	684,179,980

# Section 6: GASB Information

## Exhibit 1 – Schedule of Employer Contributions

(\$ in thousands)

Fiscal Year Ended June 30	Actuarially Determined Contribution (ADC)*	Percentage Contributed
2011	\$2,743,221	84.7%
2012	3,429,945	74.6%
2013	3,582,033	79.8%
2014	4,091,978	87.8%
2015	4,119,526	85.5%
2016	4,582,530	84.9%
2017	6,248,879	66.2%
2018	7,080,756	59.0%
2019	7,429,037	61.3%
2020	7,988,612	60.8%

*\* Prior to 2017, the ADC is the same as the GASB ARC determined under GASB 25. Beginning in FY 2017, the ADC is based on the Board's funding policy.*

The information presented above was determined as part of the actuarial valuation as of two years prior to the dates indicated (e.g., the contribution determined by the valuation completed as of June 30, 2018, was contributed in the fiscal year ended June 30, 2020).

## Section 6: GASB Information

### Exhibit 1 – Schedule of Employer Contributions *continued*

(\$ in thousands)

Fiscal Year	Actuarially Determined Contributions	State Contributions	Federal and Employer Contributions	Total Non-Member Contributions	Contribution Deficiency	Covered Payroll	Total Non-Member Contributions as a Percentage of Covered Payroll
2011	\$2,743,221	\$2,169,518	\$154,150	\$2,323,668	\$419,553	\$9,205,603	25.2%
2012	3,429,945	2,405,172	153,409	2,558,581	871,364	9,321,098	27.4%
2013	3,582,033	2,702,278	155,787	2,858,065	723,968	9,394,741	30.4%
2014	4,091,978	3,437,478	157,228	3,594,706	497,272	9,512,810	37.8%
2015	4,119,526	3,376,878	144,780	3,521,658	597,868	9,641,171	36.5%
2016	4,582,530	3,741,802	147,408	3,889,210	693,320	9,811,614	39.6%
2017	6,248,879*	3,985,783	148,749	4,134,532	2,114,347	9,965,570	41.5%
2018	7,080,756	4,094,616	84,034	4,178,650	2,902,106	10,163,980	41.1%
2019	7,429,037	4,465,578	87,707	4,553,285	2,875,752	10,450,452	43.6%
2020	7,988,612	4,763,078	92,038	4,855,116	3,133,496	10,827,439	44.8%

\* Reflects implementation of the Board-Adopted Funding Policy

## Section 6: GASB Information

### Exhibit 2 – Schedule of Funding Progress

(\$ in thousands)

(1)	(2)	(3)	(4)	(5)	(6)	(7)
Valuation Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded Actuarial Accrued Liability (UAAL) (3) – (2)	Funded Ratio (2) / (3)	Covered Payroll	UAAL as a % of Payroll (4) / (6)
6/30/2011	\$37,769,753	\$81,299,745	\$43,529,992	46.5%	\$9,205,603	472.9%
6/30/2012	37,945,397	90,024,945	52,079,548	42.1%	9,321,098	558.7%
6/30/2013	38,155,191	93,886,989	55,731,798	40.6%	9,394,741	593.2%
6/30/2014	42,150,765	103,740,377	61,589,612	40.6%	9,512,810	647.4%
6/30/2015	45,435,193	108,121,825	62,686,632	42.0%	9,641,171	650.2%
6/30/2016	47,222,098	118,629,890	71,407,792	39.8%	9,811,614	727.8%
6/30/2017	49,467,525	122,904,034	73,436,509	40.2%	9,965,570	736.9%
6/30/2018	51,730,890	127,019,330	75,288,440	40.7%	10,163,980	740.7%
6/30/2019	53,391,193	131,456,969	78,065,776	40.6%	10,450,452	747.0%
6/30/2020	54,890,976	135,598,547	80,707,571	40.5%	10,827,439	745.4%



## Section 6: GASB Information

### Exhibit 3 – Solvency Test

(\$ in thousands)

Valuation as of June 30	Actuarial Accrued Liability for:			Valuation Assets	Portion of Actuarial Accrued Liability Covered by Valuation Assets		
	(1)	(2)	(3)		(1)	(2)	(3)
	Active Member Contributions	Retirees and Beneficiaries	Active Member (Employer Financed Portion)				
2011	\$8,048,689	\$50,567,880	\$22,683,176	\$37,769,753	100%	59%	0%
2012	8,270,073	58,734,636	23,020,236	37,945,397	100%	51%	0%
2013	8,569,939	61,254,334	24,062,715	38,155,191	100%	48%	0%
2014	8,890,558	65,614,627	29,235,192	42,150,765	100%	51%	0%
2015	9,281,893	70,545,782	28,294,150	45,435,193	100%	51%	0%
2016	9,629,934	77,688,075	31,311,881	47,222,098	100%	48%	0%
2017	9,683,095	80,882,353	32,338,586	49,467,525	100%	49%	0%
2018	10,057,427	82,968,465	33,993,438	51,730,890	100%	50%	0%
2019	10,474,097	85,788,806	35,194,066	53,391,193	100%	50%	0%
2020	10,902,747	88,185,983	36,509,817	54,890,976	100%	50%	0%

## Section 6: GASB Information

### Exhibit 4 – Net Pension Liability

	June 30, 2020	June 30, 2019
<b>The components of the net pension liability:</b>		
Total pension liability	\$138,531,733,887	\$134,370,954,628
Plan fiduciary net position	<u>(52,316,477,771)</u>	<u>(53,262,789,367)</u>
Net pension liability	\$86,215,256,116	\$81,108,165,261
Plan fiduciary net position as a percentage of the total pension liability	37.8%	39.6%

*Plan provisions:* The plan provisions used in the measurement of the net pension liability are the same as those used in the actuarial valuation as of June 30, 2020.

*Actuarial assumptions:* The total pension liability was determined by an actuarial valuation as of June 30, 2020, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.50%
Salary increases	9.50% at one year of service to 4.00% at 20 and more years of service
Investment rate of return	7.00%
Cost-of-living adjustments	Tier I: 3% compounded Tier II: 1.25% not compounded

The assumed mortality rates are based on the Society of Actuaries RP-2014 White Collar mortality tables, with adjustments for TRS experience, with generational improvement based on Scale MP-2017.

The actuarial assumptions used were based on the results of an experience study dated September 18, 2018.

## Section 6: GASB Information

### Exhibit 4 – Net Pension Liability *continued*

*Discount rate:* The discount rate used to measure the total pension liability was 7.00% as of June 30, 2020. The projection of cash flows used to determine the discount rate assumes that member and employer contributions will be made at rates equal to those based on this June 30, 2020, Actuarial Valuation Report. For this purpose, only employer contributions that are intended to fund benefits of current plan members and their beneficiaries are included. Projected member and employer contributions for future plan members are included, to the extent that they exceed the service costs of future plan members.

Based on those assumptions, the pension plan's fiduciary net position was projected to be available to make all projected future benefit payments for current plan members as of June 30, 2020. Therefore, the long-term expected rate of return was applied to all periods of projected benefit payments to determine the total pension liability as of June 30, 2020.

*Sensitivity of the net pension liability to changes in the discount rate.* The following presents the net pension liability as of June 30, 2020, calculated using the discount rate of 7.00%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.00%) or 1-percentage-point higher (8.00%) than the current rate:

	<b>1% Decrease (6.00%)</b>	<b>Current Discount Rate (7.00%)</b>	<b>1% Increase (8.00%)</b>
Net pension liability as of June 30, 2020	\$104,649,618,237	\$86,215,256,116	\$71,038,443,785

## Section 6: GASB Information

### Exhibit 5 – Schedules of Changes in Net Pension Liability

Fiscal Year Ended June 30	2020	2019	2018	2017	2016
<b>Total pension liability</b>					
Service cost	\$1,991,622,987	\$1,947,627,286	\$1,838,002,948	\$1,877,570,053	\$1,681,242,232
Interest	9,296,897,060	8,991,684,121	8,703,519,454	8,390,352,464	8,264,257,311
Change of benefit terms	0	0	(374,603,419)	0	0
Differences between expected and actual experience	(28,215,833)	258,778,925	1,191,346,970	482,486,212	701,827,169
Changes of assumptions	0	77,241,572	(666,054,719)	(2,725,599,755)	7,553,894,504
Benefit payments, including refunds of employee contributions	(7,099,524,955)	(6,818,760,572)	(6,551,634,376)	(6,438,005,920)	(5,931,207,177)
<b>Net change in total pension liability</b>	<b>\$4,160,779,259</b>	<b>\$4,456,571,332</b>	<b>\$4,140,576,858</b>	<b>\$1,586,803,054</b>	<b>\$12,270,014,039</b>
<b>Total pension liability – beginning</b>	<b>134,370,954,628</b>	<b>129,914,383,296</b>	<b>125,773,806,438</b>	<b>124,187,003,384</b>	<b>111,916,989,345</b>
<b>Total pension liability – ending (a)</b>	<b><u>\$138,531,733,887</u></b>	<b><u>\$134,370,954,628</u></b>	<b><u>\$129,914,383,296</u></b>	<b><u>\$125,773,806,438</u></b>	<b><u>\$124,187,003,384</u></b>
<b>Plan fiduciary net position</b>					
Contributions – employer	\$92,658,238	\$88,514,781	\$84,633,117	\$149,495,577	\$148,040,767
Contributions – nonemployer contributing entity	4,813,451,679	4,466,020,692	4,095,125,358	3,986,363,699	3,742,469,245
Contributions – member	994,400,416	963,972,120	938,037,245	929,130,165	951,809,398
Net investment income	275,669,398	2,617,831,332	4,049,271,728	5,520,453,001	(44,103,178)
Benefit payments, including refunds of employee contributions	(7,099,524,955)	(6,818,760,572)	(6,551,634,376)	(6,438,005,920)	(5,931,207,177)
Administrative expense	(22,966,372)	(24,335,680)	(21,550,896)	(22,728,735)	(22,967,917)
<b>Net change in plan fiduciary net position</b>	<b>(\$946,311,596)</b>	<b>\$1,293,242,673</b>	<b>\$2,593,882,176</b>	<b>\$4,124,707,787</b>	<b>(\$1,155,958,862)</b>
<b>Plan fiduciary net position – beginning</b>	<b>53,262,789,367</b>	<b>51,969,546,694</b>	<b>49,375,664,518</b>	<b>45,250,956,731</b>	<b>46,406,915,593</b>
<b>Plan fiduciary net position – ending (b)</b>	<b><u>\$52,316,477,771</u></b>	<b><u>\$53,262,789,367</u></b>	<b><u>\$51,969,546,694</u></b>	<b><u>\$49,375,664,518</u></b>	<b><u>\$45,250,956,731</u></b>
<b>Net pension liability – ending (a) – (b)</b>	<b>\$86,215,256,116</b>	<b>\$81,108,165,261</b>	<b>\$77,944,836,602</b>	<b>\$76,398,141,920</b>	<b>\$78,936,046,653</b>
<b>Plan fiduciary net position as a percentage of the total pension liability</b>	<b>37.8%</b>	<b>39.6%</b>	<b>40.0%</b>	<b>39.3%</b>	<b>36.4%</b>
<b>Actual covered employee payroll</b>	<b>\$10,827,438,800</b>	<b>\$10,450,452,444</b>	<b>\$10,163,980,000</b>	<b>\$9,965,569,893</b>	<b>\$9,811,614,284</b>
<b>Plan net pension liability as percentage of covered employee payroll</b>	<b>796.3%</b>	<b>776.1%</b>	<b>766.9%</b>	<b>766.6%</b>	<b>804.5%</b>

## Section 6: GASB Information

### Exhibit 6 – Reconciliation of Collective Net Pension Liability

Changes in the collective net pension liability from the beginning of the year to the end of the year arise from the net difference between changes in the total pension liability and plan fiduciary net position that occurred during the year. Changes in net pension liability will be recognized immediately as pension expense, or reported as deferred outflows of resources related to pensions or deferred inflows of resources related to pensions, depending on the nature of the change.

Differences between actual and expected investment-related experience are recognized over a closed five-year period. Differences between actual and expected non-investment-related experience and changes of assumptions are recognized over the average of the expected remaining service lives of all members who are provided with pensions through the pension plan (active employees and inactive employees). The amounts below that are not included in pension expense for the current year are included in deferred outflows of resources or deferred inflows of resources related to pensions.

	Increase/(Decrease) For Fiscal Year Ended June 30, 2020		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) – (b)
<b>Balances at beginning of year</b>	\$134,370,954,628	\$53,262,789,367	\$81,108,165,261
<b>Changes for the year</b>			
Service cost	1,991,622,987		1,991,622,987
Interest	9,296,897,060		9,296,897,060
Differences between expected and actual experience	(28,215,833)		(28,215,833)
Contributions – employer		92,658,238	(92,658,238)
Contributions – nonemployer contributing entity		4,813,451,679	(4,813,451,679)
Contributions – member		994,400,416	(994,400,416)
Net investment income		275,669,398	(275,669,398)
Benefit payments, including refunds of employee contributions	(7,099,524,955)	(7,099,524,955)	0
Administrative expense		(22,966,372)	22,966,372
Change of assumptions	0	0	0
Change of benefit terms	0	0	0
<b>Net changes</b>	4,160,779,259	(946,311,596)	5,107,090,855
<b>Balances at end of year</b>	<u>\$138,531,733,887</u>	<u>\$52,316,477,771</u>	<u>\$86,215,256,116</u>

## Section 6: GASB Information

### Exhibit 7 – Collective Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions

	Year Established	Original Balance	Original Amortization Period	Amortization Amount at June 30, 2020	Outstanding Balance at June 30, 2020
<b>Outflows</b>					
Demographic	2016	\$701,827,169	5.21	\$134,707,710	\$28,288,619
Investment	2016	3,482,927,259	5.00	696,585,451	-
Assumption	2016	7,553,894,504	5.21	1,449,883,782	304,475,594
Demographic	2017	482,486,212	5.14	93,868,913	107,010,560
Demographic	2018	1,191,346,970	5.46	218,195,416	536,760,722
Demographic	2019	258,778,925	5.43	47,657,261	163,464,403
Investment	2019	973,676,334	5.00	194,735,267	584,205,800
Assumption	2019	77,241,572	5.43	14,224,967	48,791,638
Investment	2020	3,409,956,524	5.00	681,991,305	2,727,965,219
<b>Total outflows</b>				<b>\$3,531,850,072</b>	<b>\$4,500,962,555</b>
<b>Inflows</b>					
Investment	2017	\$2,401,737,113	5.00	\$480,347,423	\$480,347,421
Assumption	2017	2,725,599,755	5.14	530,272,326	604,510,451
Investment	2018	643,913,847	5.00	128,782,769	257,565,540
Assumption	2018	666,054,719	5.46	121,988,044	300,090,587
Demographic	2020	28,215,833	5.42*	5,205,873	23,009,960
<b>Total inflows</b>				<b>\$1,266,596,435</b>	<b>\$1,665,523,959</b>

\* Equal to the total expected remaining service lives of 2,325,911 years, divided by total employees that are provided with pensions through the plan of 429,064 (as shown in the table below), rounded to two decimal places

	Expected Remaining Service	Counts	Average of the Expected Remaining Service
Actives Members	2,325,911	163,075	14.26
Inactive Members	-	141,271	-
Retirees and Beneficiaries	-	124,718	-
<b>Total Employees</b>	<b>2,325,911</b>	<b>429,064</b>	<b>5.42</b>

## Section 6: GASB Information

### Exhibit 7 – Collective Deferred Outflows of Resources and Deferred Inflows of Resources Related to Pensions *continued*

Fiscal Year Ended June 30	2020	2019
<b>Deferred Outflows of Resources</b>		
Difference between expected and actual experience in the Total Pension Liability	\$835,524,304	\$1,329,953,604
Changes of assumptions or other inputs	353,267,232	1,817,375,981
Net difference between projected and actual earnings on pension plan investments	<u>2,574,258,058</u>	<u>128,483,365</u>
Total Deferred Outflows of Resources	\$3,763,049,594	\$3,275,812,950
<b>Deferred Inflows of Resources</b>		
Difference between expected and actual experience in the Total Pension Liability	\$23,009,960	\$ -
Changes of assumptions or other inputs	904,601,038	1,556,861,408
Net difference between projected and actual earnings on pension plan investments	<u>-</u>	<u>-</u>
Total Deferred Inflows of Resources	\$927,610,998	\$1,556,861,408
<b>Net Deferred Outflows/(Inflows) of Resources</b>	<b>\$2,835,438,596</b>	<b>\$1,718,951,542</b>
Deferred outflows of resources and deferred inflows of resources related to pension will be recognized as follows:		
Year Ended June 30:		
2020	N/A	\$1,588,468,205
2021	\$316,840,909	(359,944,523)
2022	839,731,050	162,945,618
2023	977,658,317	300,872,885
2024	703,394,788	26,609,357
2025	(2,186,468)	-
Thereafter	-	-

## Section 6: GASB Information

### Exhibit 8 – Collective Pension Expense

	Fiscal Year Ended June 30, 2020	Fiscal Year Ended June 30, 2019
<b>Components of pension expense</b>		
Service cost	\$1,991,622,987	\$1,947,627,286
Interest on the total pension liability	9,296,897,060	8,991,684,121
Projected earnings on plan investments	(3,685,625,922)	(3,591,507,666)
Contributions – member	(994,400,416)	(963,972,120)
Administrative expense	22,966,372	24,335,680
Current year recognition of:		
Changes of assumptions	811,848,379	1,026,230,333
Difference between expected and actual experience	489,223,427	478,372,958
Difference between projected and actual earnings on pension plan investments	964,181,831	606,536,234
Change of benefit terms	-	-
<b>Total pension expense</b>	<b><u>\$8,896,713,718</u></b>	<b><u>\$8,519,306,826</u></b>



## Section 6: GASB Information

### Exhibit 9 – Development of Blended Discount Rate

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expense	Projected Investment Earnings	Projected Ending Fiduciary Net Position
2021	\$52,316,477,771	\$6,239,557,102	\$7,445,204,414	\$30,377,261	\$3,618,892,584	\$54,699,345,782
2022	54,699,345,782	6,790,578,530	7,715,248,175	38,590,422	3,795,240,102	57,531,325,817
2023	57,531,325,817	6,972,268,024	7,989,500,729	38,799,772	3,990,231,671	60,465,525,011
2024	60,465,525,011	7,175,630,595	8,265,271,619	39,085,139	4,193,081,335	63,529,880,184
2025	63,529,880,184	7,407,534,990	8,552,036,637	39,424,361	4,405,654,203	66,751,608,378
2026	66,751,608,378	7,632,754,805	8,844,812,215	39,817,782	4,628,796,955	70,128,530,141
2027	70,128,530,141	7,806,214,245	9,151,922,316	40,249,070	4,860,488,610	73,603,061,610
2028	73,603,061,610	7,960,267,718	9,469,730,535	40,671,342	5,097,959,617	77,150,887,068
2029	77,150,887,068	8,117,436,017	9,793,928,868	41,047,944	5,340,448,167	80,773,794,439
2030	80,773,794,439	8,263,198,578	10,127,176,970	41,432,643	5,587,476,225	84,455,859,629
2031	84,455,859,629	8,415,325,697	10,469,413,246	41,816,227	5,838,553,542	88,198,509,396
2032	88,198,509,396	8,583,335,647	10,820,560,146	42,190,695	6,094,116,126	92,013,210,328
2033	92,013,210,328	8,766,709,123	11,183,090,407	42,534,947	6,354,862,655	95,909,156,751
2034	95,909,156,751	9,659,516,760	11,547,666,052	42,843,404	6,646,056,228	100,624,220,283
2035	100,624,220,283	9,843,262,593	11,914,498,852	43,118,531	6,969,693,002	105,479,558,495
2036	105,479,558,495	10,032,945,882	12,275,799,636	43,385,689	7,303,550,714	110,496,869,766
2037	110,496,869,766	10,231,609,451	12,634,195,885	43,656,622	7,649,162,377	115,699,789,086
2038	115,699,789,086	10,437,716,417	12,996,849,725	43,947,535	8,007,877,407	121,104,585,650
2039	121,104,585,650	10,646,384,312	13,349,227,859	44,231,403	8,381,173,372	126,738,684,072
2040	126,738,684,072	10,858,698,898	13,689,827,864	44,486,464	8,771,061,345	132,634,129,986
2041	132,634,129,986	11,080,049,438	13,987,302,299	44,732,792	9,181,069,601	138,863,213,934
2042	138,863,213,934	11,312,428,828	14,274,159,820	44,995,448	9,615,189,550	145,471,677,045
2043	145,471,677,045	11,552,757,924	14,520,264,167	45,281,830	10,077,569,811	152,536,458,783
2044	152,536,458,783	11,801,697,035	14,713,747,670	45,581,589	10,574,034,987	160,152,861,546
2045	160,152,861,546	12,063,713,350	14,855,527,705	45,894,561	11,111,380,496	168,426,533,126
2046	168,426,533,126	1,697,665,957	14,944,191,950	46,226,815	11,324,610,971	166,458,391,289
2047	166,458,391,289	1,645,430,989	14,989,406,530	46,609,887	11,183,416,900	164,251,222,761
2048	164,251,222,761	1,606,125,392	14,996,035,564	46,975,113	11,027,294,608	161,841,632,084
2049	161,841,632,084	1,595,335,200	14,978,227,578	47,294,360	10,858,857,710	159,270,303,056
2050	159,270,303,056	1,605,693,101	14,946,974,498	47,537,865	10,680,312,540	156,561,796,334
2051	156,561,796,334	1,617,708,495	14,941,432,477	47,682,462	10,491,326,518	153,681,716,409
2052	153,681,716,409	1,629,737,745	14,955,186,927	47,455,412	10,289,668,488	150,598,480,303
2053	150,598,480,303	1,640,764,805	14,973,316,564	47,177,577	10,073,603,094	147,292,354,060
2054	147,292,354,060	1,650,243,254	14,993,645,502	46,849,863	9,841,805,960	143,743,907,909
2055	143,743,907,909	1,659,103,495	15,007,587,598	46,473,334	9,593,250,043	139,942,200,515
2056	139,942,200,515	1,667,984,514	15,060,719,775	46,049,205	9,325,596,580	135,829,012,630
2057	135,829,012,630	1,677,188,511	15,101,067,937	45,578,838	9,036,599,845	131,396,154,211

## Section 6: GASB Information

### Exhibit 9 – Development of Blended Discount Rate *continued*

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expense	Projected Investment Earnings	Projected Ending Fiduciary Net Position
2058	\$131,396,154,211	\$1,686,592,301	\$15,095,287,536	\$45,063,734	\$8,726,849,231	\$126,669,244,474
2059	126,669,244,474	1,696,881,606	15,046,138,540	44,505,523	8,398,065,427	121,673,547,444
2060	121,673,547,444	1,709,558,399	14,945,673,089	43,905,957	8,052,347,598	116,445,874,395
2061	116,445,874,395	1,725,380,008	14,855,583,007	43,266,901	7,690,139,761	110,962,544,256
2062	110,962,544,256	1,744,662,211	14,719,443,137	42,590,325	7,311,770,104	105,256,943,110
2063	105,256,943,110	1,766,757,121	14,511,890,542	41,878,287	6,920,440,608	99,390,372,010
2064	99,390,372,010	1,791,326,114	14,256,586,170	41,132,933	6,519,602,286	93,403,581,306
2065	93,403,581,306	1,818,032,471	13,951,964,849	40,356,478	6,112,150,581	87,341,443,031
2066	87,341,443,031	1,846,759,433	13,613,571,266	39,551,198	5,700,678,306	81,235,758,305
2067	81,235,758,305	1,877,289,992	13,240,032,315	38,719,420	5,287,451,920	75,121,748,482
2068	75,121,748,482	1,908,728,671	12,820,373,943	37,863,508	4,875,289,586	69,047,529,289
2069	69,047,529,289	1,940,930,822	12,364,858,469	36,985,854	4,467,195,078	63,053,810,865
2070	63,053,810,865	1,973,804,439	11,873,850,260	36,088,869	4,066,002,046	57,183,678,222
2071	57,183,678,222	2,007,202,692	11,351,313,364	35,174,967	3,674,582,478	51,478,975,062
2072	51,478,975,062	2,041,125,838	10,802,507,805	34,246,558	3,295,681,256	45,979,027,792
2073	45,979,027,792	2,075,580,557	10,230,280,892	33,306,038	2,931,951,722	40,722,973,141
2074	40,722,973,141	2,110,574,036	9,638,748,121	32,355,776	2,585,989,575	35,748,432,855
2075	35,748,432,855	2,146,113,796	9,019,733,256	31,398,108	2,260,714,685	31,104,129,972
2076	31,104,129,972	2,182,207,488	8,381,021,290	30,435,324	1,959,265,379	26,834,146,225
2077	26,834,146,225	2,218,862,883	7,741,937,544	29,469,666	1,684,051,184	22,965,653,082
2078	22,965,653,082	2,256,087,871	7,110,052,708	28,503,309	1,436,709,331	19,519,894,266
2079	19,519,894,266	2,293,890,469	6,488,072,275	27,538,366	1,218,632,393	16,516,806,487
2080	16,516,806,487	2,332,278,820	5,874,442,901	26,576,872	1,031,270,521	13,979,336,056
2081	13,979,336,056	2,371,261,201	5,286,731,240	25,620,781	875,615,345	11,913,860,580
2082	11,913,860,580	2,410,846,023	4,731,461,257	24,671,962	751,885,189	10,320,458,573
2083	10,320,458,573	2,451,041,834	4,204,175,996	23,732,189	660,241,778	9,203,834,000
2084	9,203,834,000	2,491,857,328	3,708,154,804	22,803,144	600,899,858	8,565,633,238
2085	8,565,633,238	2,533,301,342	3,245,346,477	21,886,406	573,906,723	8,405,608,420
2086	8,405,608,420	2,575,382,866	2,817,801,512	20,983,455	579,173,516	8,721,379,834
2087	8,721,379,834	2,618,111,041	2,426,871,989	20,095,663	616,486,607	9,509,009,829
2088	9,509,009,829	2,661,495,168	2,073,159,027	19,224,299	685,549,603	10,763,671,274
2089	10,763,671,274	2,705,544,710	1,756,458,607	18,370,521	786,032,035	12,480,418,891
2090	12,480,418,891	2,750,269,297	1,475,788,628	17,535,382	917,622,407	14,654,986,585
2091	14,654,986,585	2,795,678,730	1,229,473,028	16,719,829	1,080,081,067	17,284,553,526
2092	17,284,553,526	2,841,782,983	1,015,385,622	15,924,698	1,273,285,290	20,368,311,478

## Section 6: GASB Information

### Exhibit 9 – Development of Blended Discount Rate *continued*

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Total Contributions	Projected Benefit Payments	Projected Administrative Expense	Projected Investment Earnings	Projected Ending Fiduciary Net Position
2093	\$20,368,311,478	\$2,888,592,214	\$831,093,038	\$15,150,725	\$1,497,263,999	\$23,907,923,927
2094	23,907,923,927	2,936,116,761	674,009,845	14,398,538	1,752,224,468	27,907,856,773
2095	27,907,856,773	2,984,367,155	541,477,420	13,668,669	2,038,572,711	32,375,650,549
2096	32,375,650,549	3,033,354,118	430,698,900	12,961,547	2,356,934,817	37,322,279,037
2097	37,322,279,037	3,083,111,800	338,962,310	12,277,509	2,708,175,052	42,762,326,070
2098	42,762,326,070	3,133,690,059	263,761,216	11,617,816	3,093,403,711	48,714,040,808
2099	48,714,040,808	3,185,102,483	202,768,950	10,984,004	3,513,980,090	55,199,370,427
2100	55,199,370,427	3,237,362,885	153,946,839	10,375,734	3,971,512,341	62,243,923,079
2101	62,243,923,079	3,290,485,309	115,346,956	9,792,622	4,467,861,716	69,877,130,526
2102	69,877,130,526	3,344,484,033	85,232,383	9,234,238	5,005,149,746	78,132,297,684
2103	78,132,297,684	3,399,373,570	62,122,627	8,700,118	5,585,760,117	87,046,608,627
2104	87,046,608,627	3,455,168,676	44,635,220	8,189,760	6,212,344,633	96,661,296,955
2105	96,661,296,955	3,511,884,351	31,664,101	7,702,633	6,887,828,903	107,021,643,476
2106	107,021,643,476	3,569,535,845	22,215,835	7,238,177	7,615,417,907	118,177,143,215
2107	118,177,143,215	3,628,138,661	15,470,797	6,795,809	8,398,605,547	130,181,620,817
2108	130,181,620,817	3,687,708,560	10,744,380	6,374,925	9,241,184,081	143,093,394,153
2109	143,093,394,153	3,748,261,563	7,413,387	5,974,905	10,147,258,155	156,975,525,580
2110	156,975,525,580	3,809,813,961	5,116,548	5,595,113	11,121,255,371	171,895,883,250
2111	171,895,883,250	3,872,382,312	3,580,391	5,234,904	12,167,936,673	187,927,386,941
2112	187,927,386,941	3,935,983,452	2,545,057	4,893,623	13,292,416,153	205,148,347,866
2113	205,148,347,866	4,000,634,495	1,842,033	4,570,612	14,500,182,115	223,642,751,831
2114	223,642,751,831	4,066,352,840	1,180,620	4,265,207	15,797,124,374	243,500,783,218
2115	243,500,783,218	4,133,156,175	746,910	3,976,745	17,189,549,963	264,818,765,701
2116	264,818,765,701	4,201,062,482	516,981	3,704,567	18,684,203,032	287,699,809,667
2117	287,699,809,667	4,270,090,044	384,128	3,448,015	20,288,305,703	312,254,373,271
2118	312,254,373,271	4,340,257,444	347,247	3,206,438	22,009,590,761	338,600,667,791
2119	338,600,667,791	4,411,583,577	124,955	2,979,191	23,856,343,525	366,865,490,746
2120	366,865,490,746	4,484,087,651	6,363	2,765,642	25,837,430,400	397,184,236,791
2121	397,184,236,791	4,557,789,193	3,135	2,565,166	27,962,329,307	429,701,786,989
2122	429,701,786,989	4,632,708,055	1,397	2,377,153	30,241,186,622	464,573,303,117
2123	464,573,303,117	4,708,864,420	304	2,201,003	32,684,864,427	501,964,830,657
2124	501,964,830,657	4,786,278,806	0	2,036,133	35,304,986,640	542,054,059,970

## Section 6: GASB Information

### Exhibit 9 – Development of Blended Discount Rate *continued*

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	"Funded" Portion of Benefit	"Unfunded" Portion of Benefit	Present Value of "Funded" Benefit Payments at 7.00%	Present Value of "Unfunded" Benefit Payments at 2.21%*	Present Value of Benefit Payments at 7.00%
2021	\$52,316,477,771	\$7,445,204,414	\$7,445,204,414	\$0	\$7,197,550,775	\$0	\$7,197,550,775
2022	54,699,345,782	7,715,248,175	7,715,248,175	0	6,970,665,358	0	6,970,665,358
2023	57,531,325,817	7,989,500,729	7,989,500,729	0	6,746,215,288	0	6,746,215,288
2024	60,465,525,011	8,265,271,619	8,265,271,619	0	6,522,497,305	0	6,522,497,305
2025	63,529,880,184	8,552,036,637	8,552,036,637	0	6,307,286,420	0	6,307,286,420
2026	66,751,608,378	8,844,812,215	8,844,812,215	0	6,096,461,557	0	6,096,461,557
2027	70,128,530,141	9,151,922,316	9,151,922,316	0	5,895,460,991	0	5,895,460,991
2028	73,603,061,610	9,469,730,535	9,469,730,535	0	5,701,108,267	0	5,701,108,267
2029	77,150,887,068	9,793,928,868	9,793,928,868	0	5,510,548,577	0	5,510,548,577
2030	80,773,794,439	10,127,176,970	10,127,176,970	0	5,325,280,779	0	5,325,280,779
2031	84,455,859,629	10,469,413,246	10,469,413,246	0	5,145,086,455	0	5,145,086,455
2032	88,198,509,396	10,820,560,146	10,820,560,146	0	4,969,770,113	0	4,969,770,113
2033	92,013,210,328	11,183,090,407	11,183,090,407	0	4,800,258,384	0	4,800,258,384
2034	95,909,156,751	11,547,666,052	11,547,666,052	0	4,632,476,419	0	4,632,476,419
2035	100,624,220,283	11,914,498,852	11,914,498,852	0	4,466,949,095	0	4,466,949,095
2036	105,479,558,495	12,275,799,636	12,275,799,636	0	4,301,314,887	0	4,301,314,887
2037	110,496,869,766	12,634,195,885	12,634,195,885	0	4,137,283,434	0	4,137,283,434
2038	115,699,789,086	12,996,849,725	12,996,849,725	0	3,977,608,069	0	3,977,608,069
2039	121,104,585,650	13,349,227,859	13,349,227,859	0	3,818,178,774	0	3,818,178,774
2040	126,738,684,072	13,689,827,864	13,689,827,864	0	3,659,437,401	0	3,659,437,402
2041	132,634,129,986	13,987,302,299	13,987,302,299	0	3,494,350,934	0	3,494,350,934
2042	138,863,213,934	14,274,159,820	14,274,159,820	0	3,332,723,891	0	3,332,723,891
2043	145,471,677,045	14,520,264,167	14,520,264,167	0	3,168,396,462	0	3,168,396,462
2044	152,536,458,783	14,713,747,670	14,713,747,670	0	3,000,575,289	0	3,000,575,289
2045	160,152,861,546	14,855,527,705	14,855,527,705	0	2,831,297,662	0	2,831,297,662
2046	168,426,533,126	14,944,191,950	14,944,191,950	0	2,661,865,492	0	2,661,865,492
2047	166,458,391,289	14,989,406,530	14,989,406,530	0	2,495,251,525	0	2,495,251,525
2048	164,251,222,761	14,996,035,564	14,996,035,564	0	2,333,042,098	0	2,333,042,098
2049	161,841,632,084	14,978,227,578	14,978,227,578	0	2,177,823,907	0	2,177,823,907
2050	159,270,303,056	14,946,974,498	14,946,974,498	0	2,031,102,552	0	2,031,102,552
2051	156,561,796,334	14,941,432,477	14,941,432,477	0	1,897,522,862	0	1,897,522,862
2052	153,681,716,409	14,955,186,927	14,955,186,927	0	1,775,018,356	0	1,775,018,356
2053	150,598,480,303	14,973,316,564	14,973,316,564	0	1,660,906,680	0	1,660,906,680
2054	147,292,354,060	14,993,645,502	14,993,645,502	0	1,554,356,688	0	1,554,356,688
2055	143,743,907,909	15,007,587,598	15,007,587,598	0	1,454,020,591	0	1,454,020,591
2056	139,942,200,515	15,060,719,775	15,060,719,775	0	1,363,708,728	0	1,363,708,728

\* Bond Buyer's 20-Bond GO index

## Section 6: GASB Information

### Exhibit 9 – Development of Blended Discount Rate *continued*

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	"Funded" Portion of Benefit	"Unfunded" Portion of Benefit	Present Value of "Funded" Benefit Payments at 7.00%	Present Value of "Unfunded" Benefit Payments at 2.21%*	Present Value of Benefit Payments at 7.00%
2057	\$135,829,012,630	\$15,101,067,937	\$15,101,067,937	\$0	\$1,277,908,550	\$0	\$1,277,908,550
2058	131,396,154,211	15,095,287,536	15,095,287,536	0	1,193,849,898	0	1,193,849,898
2059	126,669,244,474	15,046,138,540	15,046,138,540	0	1,112,114,787	0	1,112,114,787
2060	121,673,547,444	14,945,673,089	14,945,673,089	0	1,032,419,646	0	1,032,419,646
2061	116,445,874,395	14,855,583,007	14,855,583,007	0	959,062,045	0	959,062,045
2062	110,962,544,256	14,719,443,137	14,719,443,137	0	888,105,595	0	888,105,595
2063	105,256,943,110	14,511,890,542	14,511,890,542	0	818,301,679	0	818,301,679
2064	99,390,372,010	14,256,586,170	14,256,586,170	0	751,313,537	0	751,313,537
2065	93,403,581,306	13,951,964,849	13,951,964,849	0	687,159,043	0	687,159,043
2066	87,341,443,031	13,613,571,266	13,613,571,266	0	626,628,559	0	626,628,559
2067	81,235,758,305	13,240,032,315	13,240,032,315	0	569,565,117	0	569,565,117
2068	75,121,748,482	12,820,373,943	12,820,373,943	0	515,431,852	0	515,431,852
2069	69,047,529,289	12,364,858,469	12,364,858,469	0	464,596,498	0	464,596,498
2070	63,053,810,865	11,873,850,260	11,873,850,260	0	416,960,171	0	416,960,171
2071	57,183,678,222	11,351,313,364	11,351,313,364	0	372,533,506	0	372,533,506
2072	51,478,975,062	10,802,507,805	10,802,507,805	0	331,329,449	0	331,329,449
2073	45,979,027,792	10,230,280,892	10,230,280,892	0	293,250,816	0	293,250,816
2074	40,722,973,141	9,638,748,121	9,638,748,121	0	258,219,196	0	258,219,196
2075	35,748,432,855	9,019,733,256	9,019,733,256	0	225,828,011	0	225,828,011
2076	31,104,129,972	8,381,021,290	8,381,021,290	0	196,108,890	0	196,108,890
2077	26,834,146,225	7,741,937,544	7,741,937,544	0	169,303,612	0	169,303,612
2078	22,965,653,082	7,110,052,708	7,110,052,708	0	145,313,380	0	145,313,380
2079	19,519,894,266	6,488,072,275	6,488,072,275	0	123,926,643	0	123,926,643
2080	16,516,806,487	5,874,442,901	5,874,442,901	0	104,865,327	0	104,865,327
2081	13,979,336,056	5,286,731,240	5,286,731,240	0	88,200,020	0	88,200,020
2082	11,913,860,580	4,731,461,257	4,731,461,257	0	73,772,238	0	73,772,238
2083	10,320,458,573	4,204,175,996	4,204,175,996	0	61,262,510	0	61,262,510
2084	9,203,834,000	3,708,154,804	3,708,154,804	0	50,499,604	0	50,499,604
2085	8,565,633,238	3,245,346,477	3,245,346,477	0	41,305,455	0	41,305,455
2086	8,405,608,420	2,817,801,512	2,817,801,512	0	33,517,604	0	33,517,604
2087	8,721,379,834	2,426,871,989	2,426,871,989	0	26,978,988	0	26,978,988
2088	9,509,009,829	2,073,159,027	2,073,159,027	0	21,539,104	0	21,539,104
2089	10,763,671,274	1,756,458,607	1,756,458,607	0	17,054,899	0	17,054,899
2090	12,480,418,891	1,475,788,628	1,475,788,628	0	13,392,190	0	13,392,190
2091	14,654,986,585	1,229,473,028	1,229,473,028	0	10,427,079	0	10,427,079

\* Bond Buyer's 20-Bond GO index

## Section 6: GASB Information

### Exhibit 9 – Development of Blended Discount Rate *continued*

Fiscal Year	Projected Beginning Fiduciary Net Position	Projected Benefit Payments	"Funded" Portion of Benefit	"Unfunded" Portion of Benefit	Present Value of "Funded" Benefit Payments at 7.00%	Present Value of "Unfunded" Benefit Payments at 2.21%*	Present Value of Benefit Payments at 7.00%
2092	\$17,284,553,526	\$1,015,385,622	\$1,015,385,622	\$0	\$8,048,054	\$0	\$8,048,054
2093	20,368,311,478	831,093,038	831,093,038	0	6,156,385	0	6,156,385
2094	23,907,923,927	674,009,845	674,009,845	0	4,666,149	0	4,666,149
2095	27,907,856,773	541,477,420	541,477,420	0	3,503,393	0	3,503,393
2096	32,375,650,549	430,698,900	430,698,900	0	2,604,345	0	2,604,345
2097	37,322,279,037	338,962,310	338,962,310	0	1,915,545	0	1,915,545
2098	42,762,326,070	263,761,216	263,761,216	0	1,393,055	0	1,393,055
2099	48,714,040,808	202,768,950	202,768,950	0	1,000,864	0	1,000,864
2100	55,199,370,427	153,946,839	153,946,839	0	710,167	0	710,167
2101	62,243,923,079	115,346,956	115,346,956	0	497,293	0	497,293
2102	69,877,130,526	85,232,383	85,232,383	0	343,421	0	343,421
2103	78,132,297,684	62,122,627	62,122,627	0	233,931	0	233,931
2104	87,046,608,627	44,635,220	44,635,220	0	157,084	0	157,084
2105	96,661,296,955	31,664,101	31,664,101	0	104,145	0	104,145
2106	107,021,643,476	22,215,835	22,215,835	0	68,289	0	68,289
2107	118,177,143,215	15,470,797	15,470,797	0	44,444	0	44,444
2108	130,181,620,817	10,744,380	10,744,380	0	28,847	0	28,847
2109	143,093,394,153	7,413,387	7,413,387	0	18,602	0	18,602
2110	156,975,525,580	5,116,548	5,116,548	0	11,999	0	11,999
2111	171,895,883,250	3,580,391	3,580,391	0	7,847	0	7,847
2112	187,927,386,941	2,545,057	2,545,057	0	5,213	0	5,213
2113	205,148,347,866	1,842,033	1,842,033	0	3,526	0	3,526
2114	223,642,751,831	1,180,620	1,180,620	0	2,112	0	2,112
2115	243,500,783,218	746,910	746,910	0	1,249	0	1,249
2116	264,818,765,701	516,981	516,981	0	808	0	808
2117	287,699,809,667	384,128	384,128	0	561	0	561
2118	312,254,373,271	347,247	347,247	0	474	0	474
2119	338,600,667,791	124,955	124,955	0	159	0	159
2120	366,865,490,746	6,363	6,363	0	8	0	8
2121	397,184,236,791	3,135	3,135	0	3	0	3
2122	429,701,786,989	1,397	1,397	0	1	0	1
2123	464,573,303,117	304	304	0	0	0	0
2124	501,964,830,657	0	0	0	0	0	0
<b>Total</b>					<b>\$157,416,975,537</b>	<b>\$0</b>	<b>\$157,416,975,537</b>

\* Bond Buyer's 20-Bond GO index

## Section 6: GASB Information

### Exhibit 10 – Assumed Rate of Investment Return

The long-term expected rate of return on pension plan investments was determined using a building-block method in which best-estimate ranges of expected future real rates of return (expected returns, net of pension plan investment expense and inflation) are developed for each major asset class. These ranges are combined to produce the long-term expected rate of return by weighting the expected future real rates of return by the target asset allocation percentage and by adding expected inflation. Best estimates of arithmetic real rates of return for each major asset class included in the pension plan's target asset allocation as of June 30, 2020 are summarized in the following table:

Asset Classes	Expected Arithmetic Returns Over 20 Years*	Target Allocation**
US Equities Large Cap	6.05%	16.5%
US Equities Small/Mid Cap	7.23	2.3
International Equities Developed	7.01	12.2
Emerging Markets Equities	9.38	3.0
US Bonds Code	2.17	7.0
US Bonds High Yield	4.09	2.5
International Debt Developed	1.52	3.1
Emerging International Debt	4.47	3.2
Real Estate	5.65	16.0
Hedge Funds (Absolute Return)	4.32	10.0
Infrastructure	6.17	4.0
Private Equity	10.53	15.0
Private Debt	6.28	<u>5.2</u>
<b>Total</b>		<b>100.0%</b>

\* Based on the Horizon Survey of Capital Market Assumptions 2019 Edition

\*\* Breakout determined with assistance from TRS staff



# Section 7: Assumptions, Benefit Provisions, and Definitions

## Summary of Assumptions and Methods

<p><b>Rationale for Assumptions:</b></p>	<p>The information and analysis used in supporting each assumption that has a significant effect on this actuarial valuation is shown in the demographic and economic experience review dated September 18, 2018.</p> <p>All assumptions were adopted by the Board effective June 30, 2018, unless otherwise noted.</p>
<p><b>Interest Rate:</b></p>	<p>7.00% per annum, compounded annually and net of investment expenses. The interest rate assumption is composed of an inflation assumption of 2.50% and real return of 4.50%. (Adopted effective June 30, 2016.)</p>
<p><b>Mortality Rates:</b></p> <p><i><b>Healthy Post-Retirement:</b></i></p> <p><i><b>Disabled Post-Retirement:</b></i></p> <p><i><b>Beneficiary Post-Retirement:</b></i></p> <p><i><b>Pre-retirement:</b></i></p>	<p>RP-2014 White Collar Annuitant Tables projected generationally with Scale MP-2017, with female rates multiplied by 70% for ages under 78 and 110% for ages 78 to 114 and male rates multiplied by 94% for ages under 81 and 110% for ages 81 to 114. (Adopted effective June 30, 2018.)</p> <p>RP-2014 Disabled Retiree Tables projected generationally with Scale MP-2017, with female and male rates multiplied by 117% for ages 45 to 99. (Adopted effective June 30, 2018.)</p> <p>RP-2014 Annuitant Tables projected generationally with Scale MP-2017, with female and male rates multiplied by 96% and 116%, respectively, for ages 50 to 114. (Adopted effective June 30, 2018.)</p> <p>RP-2014 White Collar Employee Tables projected generationally with Scale MP-2017, with female and male rates multiplied by 104% for all ages. (Adopted effective June 30, 2018.)</p>



## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Assumptions and Methods *continued*

#### Salary Increase Rates:

The components include 2.50% inflation, plus merit and seniority increases. (Adopted effective June 30, 2018.) Salary increase rates are shown below for selected years of service.

Service	Rate
1	9.50%
2	7.50%
3	7.00%
4	6.75%
5	6.50%
10	5.50%
15	4.75%
20 and above	4.00%

For a member who works 34 years, the assumed average salary increase over their career is 4.94% per year.

The actual average salary increase for teachers who were in full-time or regular part-time status at both June 30, 2018 and June 30, 2019 is 5.67%.

#### Disability Rates:

Shown below for selected ages (Adopted effective June 30, 2018.)

Age	Male	Female
25	0.01%	0.03%
30	0.01%	0.04%
35	0.02%	0.06%
40	0.03%	0.07%
45	0.05%	0.10%
50	0.10%	0.18%
55	0.14%	0.20%
60	0.18%	0.27%
65	0.25%	0.30%

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Assumptions and Methods *continued*

#### Termination: Rates:

Termination rates based on service, for causes other than death, disability, or retirement (Adopted effective June 30, 2018.)

Age	Under 5 Years of Service		5 or More Years of Service	
	Male	Female	Male	Female
25	7.0%	6.5%	3.0%	5.0%
30	6.5%	7.0%	3.0%	4.8%
35	8.0%	7.5%	1.5%	3.0%
40	10.0%	8.0%	1.8%	1.5%
45	11.0%	8.0%	1.3%	1.3%
50	12.0%	8.0%	1.3%	1.5%
55	11.5%	11.8%	2.0%	2.0%
60	15.0%	14.0%	3.0%	2.5%
65	30.0%	30.0%	3.0%	3.0%

#### Retirement Rates:

The following rates of retirement are assumed for active members hired before January 1, 2011 (Adopted effective June 30, 2018.):

Age	Service				
	5 – 18	19 – 29	30 – 31	32 – 33	34+
54	0%	7%	8%	40%	45%
55	0%	7%	8%	40%	45%
56	0%	7%	8%	40%	45%
57	0%	7%	10%	40%	45%
58	0%	7%	10%	40%	40%
59	0%	30%	35%	60%	40%
60	20%	30%	40%	60%	40%
61	17%	30%	40%	50%	40%
62	15%	30%	40%	50%	40%
63	15%	30%	40%	50%	40%
64	22%	40%	45%	50%	40%
65	25%	40%	45%	50%	40%
66	25%	40%	45%	50%	40%
67	20%	40%	45%	50%	45%
68	20%	40%	40%	50%	45%
69	25%	40%	40%	50%	45%
70	100%	100%	100%	50%	30%
71	100%	100%	100%	50%	30%
72	100%	100%	100%	50%	30%
73	100%	100%	100%	50%	30%
74	100%	100%	100%	100%	30%
75	100%	100%	100%	100%	100%

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Assumptions and Methods *continued*

<p><b>Retirement Rates (continued):</b></p>	<p>The following rates of retirement are assumed for active members hired on or after January 1, 2011:</p> <table border="1" data-bbox="821 342 1780 792"> <thead> <tr> <th rowspan="2">Age</th> <th colspan="5">Service</th> </tr> <tr> <th>9 – 18</th> <th>19 – 30</th> <th>31</th> <th>32 – 33</th> <th>34+</th> </tr> </thead> <tbody> <tr> <td>61 and younger</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> <td>0%</td> </tr> <tr> <td>62</td> <td>13%</td> <td>15%</td> <td>20%</td> <td>25%</td> <td>25%</td> </tr> <tr> <td>63</td> <td>8%</td> <td>10%</td> <td>15%</td> <td>20%</td> <td>20%</td> </tr> <tr> <td>64</td> <td>8%</td> <td>10%</td> <td>15%</td> <td>20%</td> <td>20%</td> </tr> <tr> <td>65</td> <td>8%</td> <td>10%</td> <td>15%</td> <td>20%</td> <td>20%</td> </tr> <tr> <td>66</td> <td>20%</td> <td>10%</td> <td>15%</td> <td>20%</td> <td>20%</td> </tr> <tr> <td>67</td> <td>20%</td> <td>40%</td> <td>70%</td> <td>70%</td> <td>70%</td> </tr> <tr> <td>68</td> <td>20%</td> <td>40%</td> <td>40%</td> <td>40%</td> <td>40%</td> </tr> <tr> <td>69</td> <td>20%</td> <td>40%</td> <td>40%</td> <td>40%</td> <td>40%</td> </tr> <tr> <td>70</td> <td>100%</td> <td>100%</td> <td>100%</td> <td>100%</td> <td>100%</td> </tr> </tbody> </table> <p>Inactive members with deferred vested benefits are assumed to retire upon reaching Normal Retirement age.</p>	Age	Service					9 – 18	19 – 30	31	32 – 33	34+	61 and younger	0%	0%	0%	0%	0%	62	13%	15%	20%	25%	25%	63	8%	10%	15%	20%	20%	64	8%	10%	15%	20%	20%	65	8%	10%	15%	20%	20%	66	20%	10%	15%	20%	20%	67	20%	40%	70%	70%	70%	68	20%	40%	40%	40%	40%	69	20%	40%	40%	40%	40%	70	100%	100%	100%	100%	100%
Age	Service																																																																							
	9 – 18	19 – 30	31	32 – 33	34+																																																																			
61 and younger	0%	0%	0%	0%	0%																																																																			
62	13%	15%	20%	25%	25%																																																																			
63	8%	10%	15%	20%	20%																																																																			
64	8%	10%	15%	20%	20%																																																																			
65	8%	10%	15%	20%	20%																																																																			
66	20%	10%	15%	20%	20%																																																																			
67	20%	40%	70%	70%	70%																																																																			
68	20%	40%	40%	40%	40%																																																																			
69	20%	40%	40%	40%	40%																																																																			
70	100%	100%	100%	100%	100%																																																																			
<p><b>Percent Married:</b></p>	<p>For valuation purposes, 85% of members are assumed to be married. Male members are assumed to be three years older than their spouses, and female members are assumed to be three years younger than their spouses.</p>																																																																							
<p><b>Inactive Vested Buyout:</b></p>	<p>22% of eligible inactive vested members are assumed to receive a lump sum buyout now in lieu of an annuity at retirement. This is consistent with the assumptions used by the Illinois legislation and may be revised in the future as experience emerges.</p>																																																																							
<p><b>Automatic Annual Increase Buyout:</b></p>	<p>15% of eligible retiring Tier I members are assumed to receive a lump sum buyout and a retirement annuity with automatic annual increases of 1.5% of the originally granted retirement benefit starting at the later of January 1 following age 67 and the first anniversary of retirement.</p>																																																																							
<p><b>Buyout Period:</b></p>	<p>Buyouts are assumed to be paid through fiscal year 2022, at which point the total expected buyout amounts are projected to reach the assumed \$650 million share apportioned for TRS. No additional buyout payments are expected to be made once this limit is reached.</p>																																																																							
<p><b>Severance Pay:</b></p>	<p>20% of retirees are assumed to receive severance pay and the average severance payment will be 10.0% of other pensionable earnings in the last year of employment. Other pensionable earnings may include payment for unused vacation days, unused sick or personal leave, retirement incentives, 403(b) or 457(b) contributions, and bonuses for performance, good attendance, longevity, etc. (Adopted effective June 30, 2018.)</p>																																																																							

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Assumptions and Methods *continued*

#### Optional Service Purchases:

The liability for retirement benefits for active members who have not previously purchased optional service is increased to cover the employer cost of out-of-system service purchased in the last two years prior to retirement. The amount purchased varies by the amount of regular service at retirement. Representative amounts purchased at retirement, and other assumptions used, are as follows (Adopted effective June 30, 2018.):

Service	Maximum Service Purchase
10 years	0.107 years
20 years	0.445 years
25 years	0.752 years
30 years	0.841 years
34 or more	None

- Actual optional service credit for each current member is provided by TRS;
- No additional service purchases will be assumed for members who currently have optional service credit;
- Members will not purchase service if it does not improve their pension benefit; and
- When optional service is purchased within the last two years prior to retirement, 25% of the cost is covered by member payments and the remaining cost is the responsibility of the employer.

#### Sick Leave Service Credit:

The assumed unused and uncompensated sick leave service credit at retirement varies by the amount of regular service at retirement. Representative assumed amounts of unused and uncompensated sick leave service are as follows (Adopted effective June 30, 2018.):

Service	Sick Leave Service Credit
20 years	0.953 years
25 years	1.137 years
30 years	1.376 years
34 years	1.387 years
35 or more	None

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Assumptions and Methods *continued*

#### Future Normal Costs:

Projected Normal Cost is based on an open group forecast with the number of active participants assumed to remain level for both full-time and substitute/hourly groups. The new entrants are assumed to enter the plan with the following demographic mix, based on previous plan experience, with new entrant salaries assumed to increase by 3.25% per annum:

Full-Time and regular part-time:

Age	Male		Female	
	Salary	Proportion	Salary	Proportion
22	\$44,325	5.5%	\$43,761	29.1%
27	47,547	7.0	48,537	28.4
32	52,014	3.3	51,597	10.6
37	56,648	1.8	52,552	5.0
42	59,139	1.0	52,230	2.8
47	59,346	0.6	53,400	1.9
52	61,768	0.4	55,336	1.2
57	62,246	0.2	56,264	0.6
62	55,628	0.1	56,851	0.3
67	67,291	0.1	60,818	0.1

Substitutes, part-time, and hourly-paid:

Age	Male		Female	
	Salary	Proportion	Salary	Proportion
22	\$19,204	6.5%	\$20,383	17.8%
27	20,653	7.7	19,622	15.2
32	20,360	3.5	18,189	8.5
37	21,661	1.6	16,151	7.7
42	19,964	1.3	16,031	8.0
47	18,330	1.4	15,773	6.7
52	18,143	1.2	15,799	4.1
57	16,778	1.2	16,459	2.4
62	16,480	1.2	16,881	1.5
67	15,836	1.0	15,891	0.9
70	15,554	0.4	15,175	0.2

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Assumptions and Methods *continued*

<b>2.2 Updated Assumption:</b>	For those active members who have already made a payment to upgrade past service prior to June 30, 1998, their benefits are based on their upgrading at the valuation date. For all other active members, they are assumed to upgrade at retirement.
<b>Tier II Pay Cap Increase:</b>	1.25% per annum (Adopted effective June 30, 2016.)
<b>Tier II COLA Increase:</b>	1.25% per annum (Adopted effective June 30, 2016.)
<b>Census and Assets:</b>	The current actuarial valuation was based on the latest membership data available, which was submitted by the System for active, inactive and retired members as of the prior valuation date. The valuation assumptions were used to project results to account for the one-year difference in the census date and the valuation date. Any change in liability due to changes in census between the collection date of the census information and the valuation date is captured in the next actuarial valuation.
<b>Administrative Expenses:</b>	\$31,439,548 of administrative expenses is expected to be paid for the year beginning July 1, 2020. \$40,892,235 of administrative expenses is expected to be paid for the year beginning July 1, 2021 and each year thereafter, increased by the rate at which payroll is expected to increase
<b>Asset Valuation Method:</b>	The actuarial value of assets for funding and to determine the Actuarially Determined Contribution is based on the fair value of assets with a five-year phase-in of actual investment return in excess of (or less than) expected investment income. Expected investment income is determined using the assumed investment return rate and the actuarial value of assets (adjusted for receipts and disbursements during the year). The actual investment return for this purpose is determined net of all investment and administrative expenses. For GASB 67 and 68, the fair value of assets is used.
<b>Actuarial Cost Method:</b>	<p>Projected Unit Credit (adopted by statute June 30, 1989) is used for funding purposes. Under this method, the projected benefits of each individual included in the valuation are allocated by a consistent formula to valuation years. The actuarial present value of benefits allocated to a valuation year is called the normal cost. The actuarial present value of benefits allocated to all periods prior to a valuation year is called the accrued liability.</p> <p>Entry Age Normal is used for GASB 67 and 68 purposes and to determine the Actuarially Determined Contribution ("Board-Adopted Actuarial Funding Policy"), based upon the funding policy adopted by the Board. Under this method, a normal cost is calculated for each employee that is the level annual contribution as a percent of pay required to be made from the employee's date of hire for as long as he/she remains active so that sufficient assets will be accumulated to provide his/her benefit. The accrued liability is the difference between the present value of all future benefits and the present value of all future normal costs.</p>

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Assumptions and Methods *continued*

**Amortization Period and Method:**

For funding purposes under the Illinois Pension Code, the unfunded liability is not explicitly amortized. The employer contribution is the amount which, as a level percentage of member payroll, will result in the System being 90% funded by June 30, 2045. For the Board-Adopted Actuarial Funding Policy, the amortization of the unfunded accrued liability is a closed 20-year period effective June 30, 2015, and declines by one year in each subsequent valuation. Sources of unfunded actuarial accrued liability that emerge in subsequent valuations are amortized over 20-year closed periods. Contributions toward the unfunded actuarial accrued liability increase by 2% each year, the estimate of increase in future State revenue growth.

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Plan Provisions

This exhibit summarizes the major provisions of the Plan included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

#### Membership:

Employers of the System include:

- The Illinois public common school districts outside of Chicago,
- Certain state agencies employing certified teachers, and
- The State Board of Education, Illinois School Board Association, statewide and national teacher organizations, educational cooperatives and the retirement system.

Employees covered under the System include:

- Any educational, administrative, professional or other staff employed in the public common schools outside the City of Chicago in a position requiring certification under the teacher certification law, including substitute teachers, part-time teachers, and hourly paid teachers who are on a flexible work schedule;
- Any position requiring teacher certification in certain state agencies;
- Any regional superintendent of schools, assistant regional superintendent of schools, State Superintendent of Education; any person employed by the State Board of Education as an executive; any executive of the boards engaged in the service of public common school education in school districts covered under this system of which the State Superintendent of Education is an ex-officio member;
- Any employee of a school board association who is certificated under the teacher certification law;
- Any person employed by the retirement system who was an employee of and a member in the system on August 17, 2001 or becomes an employee of the system on or after August 17, 2001;
- Any educational, administrative, professional or other staff employed by and under the supervision and control of a regional superintendent of schools, provided such employment position requires the person to be certificated under the teacher certification law;
- Any educational, administrative, professional or other staff in a certificated position employed by a program serving two or more school districts in accordance with a joint agreement authorized by the School Code or by federal legislation;
- Any officer or employee of a statewide teacher organization or officer of a national teacher organization who is certified under the teacher certification law, provided the member had previously established creditable service under TRS and files an irrevocable election for TRS membership before January 5, 2012, and does not receive credit under any other article of the pension code; and



## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Plan Provisions *continued*

<b>Membership (continued):</b>	<ul style="list-style-type: none"><li>Any educational, administrative, professional, or other staff employed in a charter school that is certificated under the teacher certification law.</li></ul> <p>Employment on a full-time basis covers only teachers whose normal employment schedule consist of working at least four clock hours daily, five days per week. Employment on a part-time basis covers teachers who are employed less than four clock hours daily or less than five days per week. A substitute teacher is employed on temporary basis to replace another teacher.</p> <p>Creditable service rendered as an employee for a regular school year in any district, in accordance with the provisions of the Pension Code, is equal to one year of service, and time less than a legal year is counted as such portion of a year as the number of days taught bears to 170 days. Additionally, members may purchase various types of optional service credit.</p> <p>“Tier II” means a member, or a benefit provision, that applies to a member who first contributed to TRS on or after January 1, 2011, and has no preexisting creditable service with a reciprocal pension system prior to January 1, 2011. “Tier I” means all other members and applicable benefit provisions.</p> <p>For determining both member benefits and contribution amounts, salary for Tier II is capped at a limit that is tied to the Consumer Price Index. The initial limit was \$106,800 as of January 1, 2011. The limit increases in each subsequent year by an amount equal to the then current limit times the lesser of 3% or one-half the percentage increase in CPI-U as of the preceding September.</p> <p>“Final average salary” means for Tier I the average salary for the highest four consecutive years within the last 10 years of creditable service, as determined under the rules of the Board. For Tier II, final average salary is for the highest eight consecutive years within the last 10 years.</p>
<b>Normal Retirement:</b>	All members of the Fund are required to contribute 9% of salary to the Fund as follows: 7% for the retirement pension, 1% for the spouse’s pension, and 1% for the automatic increases in the retirement pension. In addition, employees are required to contribute \$3.60 per month toward the cost of the single sum death benefit.
<b>Tiers:</b>	Tier I: First hired before January 1, 2011. Tier II: First hired on or after January 1, 2011.

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Plan Provisions *continued*

<b>Retirement Pension:</b>	
<b>Eligibility:</b>	<i>Tier I:</i> Age 60 with 10 years of service, or age 62 with 5 years of service <i>Tier II:</i> Age 67 with 10 years of service
<b>Amount:</b>	<i>Tier I:</i> For members who first became a teacher before July 1, 2005, the annual benefit amount is the greatest of (i), (ii) and (iii) below. For members who first became a teacher on or after July 1, 2005, the annual benefit amount is the greater of (i) and (ii) below.  <i>Tier II:</i> The annual benefit is the amount under (i) below.  (i) For service earned before July 1, 1998, 1.67% of final average salary for each of the first 10 years of creditable service, plus 1.90% of final average salary for each year in excess of 10 but not exceeding 20, plus 2.10% of final average salary for each year in excess of 20 but not exceeding 30, and 2.30% of final average salary for each year in excess of 30. For all other service, 2.2% of final average salary.*  (ii) 1½% of final average salary for each year of creditable service, plus \$7.50 per year for each of the first 20 years of creditable service.  (iii) An actuarially equivalent life annuity, resulting from the member's contributions and State-matching contributions (1.4 times member contributions) plus compound interest on both.  Maximum amount under (i) and (ii) above is 75% of final average salary.
<b>Early Retirement:</b>	
<b>Eligibility:</b>	<i>Tier I:</i> Age 55 with 20 years of service <i>Tier II:</i> Age 62 with 10 years of service
<b>Amount:</b>	<i>Tier I:</i> Equal to the amount computed under normal retirement, reduced by 6% for each year the member is under age 60. There is no reduction for a member who retires prior to age 60 with 35 years of credited service.  <i>Tier II:</i> Equal to the amount computed under normal retirement, reduced by 6% for each year the member is under age 67.

\* Service earned before July 1, 1998 can be upgraded to 2.2% through additional member contributions of 1% of the member's highest salary within the last four years for each year of prior service. Maximum payment is 20% of salary, but all years are upgraded. The number of years to be upgraded is reduced by one for each three full years worked under the 2.2% formula. The 2.2% formula upgrade cost is reduced on a sliding scale for members who have more than 34 years of service credit.

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Plan Provisions *continued*

<b>Rule of 85 for State Employees:</b>	A Tier I employee of a state agency retiring on or after January 1, 2001 is entitled to a non-discounted annuity if his or her attained age at retirement and total creditable service equal at least 85, provided he or she has (i) earned during the period immediately preceding the last day of service at least one year of contributing creditable service as a state employee and (ii) has earned at least 5 years of contributing creditable service as a state employee.
<b>Single Sum Benefit:</b> <b>Eligibility:</b> <b>Amount:</b>	Age 65 with fewer than 5 years of creditable service after July 1, 1947  Lump sum payment actuarially equivalent to a life annuity consisting of 1.67% of final average salary for each year of service.
<b>Temporary Disability Benefit:</b> <b>Eligibility:</b> <b>Amount:</b>	3 years of credited service  Equal to 40% of the member's most recent annual contract salary at time of disablement. The benefit is payable beginning with the 31st day after disablement and ending at the earlier of (1) cessation of disability, (2) when the member requests termination of the benefit, (3) when the period for which payments have been made equals one-fourth the period of creditable service, or (4) the member is gainfully employed or able to be gainfully employed.
<b>Disability Retirement Benefit:</b> <b>Eligibility:</b> <b>Amount:</b>	Termination of temporary disability benefit, provided member remains disabled  The greater of: (a) 35% of the member's most recent annual contract salary, or (b) the benefit payable for normal retirement, but reduced by 1/2% for each month by which the member is less than age 60, or age 55 if the member has 20 years of service.  Other formulas may be applicable if disability retirement occurred prior to July 1, 1971.
<b>Occupational Disability:</b> <b>Eligibility:</b> <b>Amount:</b>	Totally and immediately incapacitated for the performance of duty  Equal to 60% of salary, if disability is duty-connected or occupational adjudicated by the Illinois Industrial Commission as compensable under either the Workers' Compensation or Occupational Diseases Act. Any amounts payable under these Acts shall be applied as an offset to any occupational disability benefits payable by the Teachers' Retirement System. In general, benefits are payable throughout the period of disability.

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Plan Provisions *continued*

<b>Deferred Vested Benefits:</b>																				
<b>Eligibility:</b>	<p><i>Tier I:</i> 5 years of service  <i>Tier II:</i> 10 years of service</p>																			
<b>Amount:</b>	<p><i>Tier I:</i> Equal to the amount computed under normal retirement deferred to age 62, if the member has less than 10 years of service. With 10 or more years of service, the annuity is payable at age 60.  <i>Tier II:</i> Equal to the amount computed under normal retirement, payable at age 67, or in a reduced amount as early as age 62. The reduction is 6% for each year the member is under age 67.</p>																			
<b>Reversionary Retirement Annuity:</b>	<p>Any member entitled to a retirement annuity for age may elect to receive a reduced annuity with the remainder determined on an actuarial basis to become, upon the member's death, an annuity for life to any designated person dependent upon the member at the time of the member's retirement, provided such payment shall not be less than \$10 nor more than the amount of reduced age retirement monthly annuity to which the member is entitled.</p>																			
<b>Refund of Contributions:</b>	<p>A member who ceases to be a member for any reason other than death or retirement, shall be entitled to a refund of all retirement contributions and payments made into the System by the member which have not previously been refunded, without interest thereon.</p>																			
<b>Death Benefit:</b>	<p>Refund of the deceased member's accumulated contributions are paid to survivors or to the member's estate. Additional lump sum death benefits are also payable:</p>																			
	<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr style="background-color: #009688; color: white;"> <th rowspan="2">Time of Death</th> <th colspan="2">Types of Beneficiaries</th> </tr> <tr style="background-color: #009688; color: white;"> <th>Dependents</th> <th>Non-dependents</th> </tr> </thead> <tbody> <tr> <td>While employed</td> <td>Lump sum up to last salary <b>or</b> \$1,000 and a monthly benefit generally not less than \$400* or \$600 with minor children**</td> <td>Lump sum up to last salary</td> </tr> <tr> <td>Inactive within 12 months of last day of credit</td> <td>Lump sum up to last salary <b>or</b> \$1,000 and a monthly benefit generally not less than \$400* or \$600 with minor children**</td> <td>Lump sum up to last salary</td> </tr> <tr> <td>Inactive with 20 or more years of service</td> <td>Lump sum of \$3,000 or 1/6 of last salary*** <b>or</b> \$1,000 and a monthly benefit generally 1/2 for Tier I and 2/3 for Tier II of member's earned benefit at time of death</td> <td>Lump sum of \$3,000 or 1/6 of last salary***</td> </tr> <tr> <td>Annuitant</td> <td>Lump sum of \$3,000 or 1/6 of last salary*** <b>or</b> \$1,000 and a monthly benefit generally 1/2 for Tier I and 2/3 for Tier II of annuitant's earned benefit at time of death</td> <td>Lump sum of \$3,000 or 1/6 of last salary***</td> </tr> </tbody> </table>			Time of Death	Types of Beneficiaries		Dependents	Non-dependents	While employed	Lump sum up to last salary <b>or</b> \$1,000 and a monthly benefit generally not less than \$400* or \$600 with minor children**	Lump sum up to last salary	Inactive within 12 months of last day of credit	Lump sum up to last salary <b>or</b> \$1,000 and a monthly benefit generally not less than \$400* or \$600 with minor children**	Lump sum up to last salary	Inactive with 20 or more years of service	Lump sum of \$3,000 or 1/6 of last salary*** <b>or</b> \$1,000 and a monthly benefit generally 1/2 for Tier I and 2/3 for Tier II of member's earned benefit at time of death	Lump sum of \$3,000 or 1/6 of last salary***	Annuitant	Lump sum of \$3,000 or 1/6 of last salary*** <b>or</b> \$1,000 and a monthly benefit generally 1/2 for Tier I and 2/3 for Tier II of annuitant's earned benefit at time of death	Lump sum of \$3,000 or 1/6 of last salary***
Time of Death	Types of Beneficiaries																			
	Dependents	Non-dependents																		
While employed	Lump sum up to last salary <b>or</b> \$1,000 and a monthly benefit generally not less than \$400* or \$600 with minor children**	Lump sum up to last salary																		
Inactive within 12 months of last day of credit	Lump sum up to last salary <b>or</b> \$1,000 and a monthly benefit generally not less than \$400* or \$600 with minor children**	Lump sum up to last salary																		
Inactive with 20 or more years of service	Lump sum of \$3,000 or 1/6 of last salary*** <b>or</b> \$1,000 and a monthly benefit generally 1/2 for Tier I and 2/3 for Tier II of member's earned benefit at time of death	Lump sum of \$3,000 or 1/6 of last salary***																		
Annuitant	Lump sum of \$3,000 or 1/6 of last salary*** <b>or</b> \$1,000 and a monthly benefit generally 1/2 for Tier I and 2/3 for Tier II of annuitant's earned benefit at time of death	Lump sum of \$3,000 or 1/6 of last salary***																		

\* Certain circumstances might provide a monthly annuity less than \$400 per month for an active member.

\*\* TRS will pay 50 percent of the member's earned retirement annuity at death if it is greater than the above amounts.

\*\*\* Certain lump sums may be greater if the annuitant or inactive member has been in retirement or out of service for less than five years.

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Plan Provisions *continued*

#### Automatic Postretirement Benefit Cost-of-Living Adjustment:

**Eligibility:**

Member contributed for at least an equivalent period of one full year of creditable service after July 1, 1969

**Amount:**

For Tier I, initial increase of 1½% of base annuity for periods prior to January 1, 1972, 2% for periods from and after January 1, 1972 and prior to January 1, 1978, and 3% for periods thereafter (such periods to exclude any period of retirement that precedes attainment of age 55). Initial increase payable effective with the later of: January 1 following first anniversary of retirement; or January 1 following attainment of age 61.

Following the initial increase, automatic annual increases payable on each January 1 thereafter. Prior to January 1, 1990, annual increases were determined as a percentage of the original retirement annuity. Effective on and after January 1, 1990, automatic annual increases granted to eligible annuitants equal 3% of the total annuity being received, including previous increases granted.

For Tier II retirement and deferred vested benefits, the annual increase is equal to the original granted annuity benefit times the lesser of 3% or one-half the increase in the CPI-U as of the preceding September. The initial increase is effective January 1 after the later of attaining age 67 or the first anniversary of the annuity starting date.

For Tier I and Tier II disability benefits, the initial increase is generally 7% effective January 1 following the fourth anniversary of the initial payment and 3% annually thereafter of the then current benefit amount.

For Tier I and Tier II survivor benefits, the initial increase is effective January 1 following the first anniversary of the initial survivor payment, or after the survivor benefit has been granted benefits for survivors of annuitants, and annually thereafter. The Tier I increase is 3% of the then current benefit. The increase for Tier II is the lesser of 3% or one-half the percentage increase in CPI-U as of the preceding September of the original benefit amount.

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Plan Provisions *continued*

<b>Member Contributions:</b>	<p>Beginning July 1, 1998, contributions for creditable service are made at the rate of 8% (exclusive of the 1% Survivor Benefit Contribution) of salary which is comprised of a rate of 7½% of salary towards the cost of the retirement annuity plus ½% of salary toward the cost of the automatic annual increase in retirement annuity.</p> <p>Beginning July 24, 1959, each member contributes an additional 1% of salary toward Survivor's Benefits. These contributions are subject to refund if there is no dependent beneficiary at retirement, provided the member elects such refund.</p> <p>Beginning July 1, 1995, each member not employed by a State agency contributes to the Teachers' Health Insurance Security Fund, administered by the Department of Central Management Services. These contributions are not refundable and do not become part of the System's assets.</p> <p>Additional contributions as are necessary to receive credit for service during which contributions were not made, such as military service or service outside the System.</p>
<b>Net Benefit Increases:</b>	<p>The term "new benefit increase" means an increase in the amount of any benefit provided by the statute, or the expansion of the eligibility requirements for any benefit provided by the statute, resulting from an amendment that takes place on or after June 1, 2005.</p> <p>Every new benefit increase must have an identified funding source whose adequacy is verified and periodically confirmed by the Commission on Government Forecasting and Accountability (CGFA).</p> <p>Every new benefit increase will automatically expire at the earlier of (i) five years after its effective date; (ii) at an earlier time specified in the amendment creating the benefit; or (iii) at the end of the fiscal year in which CGFA certifies that the identified funding source is inadequate; except that any new benefit increase will continue to apply to persons who applied for and qualified for the increase while it was in effect, and except that any new benefit increase may be extended or recreated by the General Assembly (subject to the adequacy of the funding source).</p>
<b>Sick Leave Service Accruals:</b>	<p>Any unused and uncompensated accumulated sick leave is counted as creditable service provided that each former employer certifies to the System the number of unused and uncompensated accumulated sick leave days upon termination of the member. The service granted is the ratio of the number of unused and uncompensated accumulated sick leave days to 170 days, subject to a maximum of two years of service credit. The period of sick leave shall not be considered in determining the effective date of retirement.</p>

## Section 7: Assumptions, Benefit Provisions and Definitions

### Summary of Plan Provisions *continued*

<b>Guaranteed Minimum Benefit:</b>	<p>For members who make a small qualifying contribution, a minimum benefit of \$25 per month per year of service, up to a maximum of \$750 per month with 30 years of service, is paid. An alternate minimum retirement annuity of \$200 per month, applicable to members with at least 10 years of service, is described under 40 ILCS 5/16-136.3. The minimum benefit is payable to the extent that funds are available under the Minimum Retirement Annuity Reserve established under 40 ILCS 5/16-186.3. The Minimum Retirement Annuity Reserve is credited with qualifying contributions made by annuitants, amounts contributed by the state that are sufficient to assure payment, and interest. The reserve is charged with the minimum benefit payments.</p> <p>The portion of the retiree's benefit that is below the minimum is paid from the Benefit Trust Reserve. Only the difference between that amount and the minimum is paid from the Minimum Retirement Annuity Reserve.</p>
<b>Inactive Vested Buyout:</b>	<p>Provides inactive vested members an option to receive an immediate lump sum in exchange for their annuity at retirement. The lump sum would be equal to 60% of the present value of future benefits. Effective for fiscal year ended June 30, 2019 to fiscal year ending June 30, 2021, subsequently extended to fiscal year ending June 30, 2024 by PA 101-0010 (SB 1814) – Budget Implementation Bill.</p>
<b>Automatic Annual Increase Buyout:</b>	<p>The automatic annual increase buyout provision gives Tier I members the option to receive a lump sum at retirement in exchange for having their automatic annual increase based on 1.5% of the originally granted annuity effective at the later of January 1 following age 67 or the first anniversary of retirement. The lump sum would be equal to 70% of the difference between the present value of benefits based on the Tier I automatic annual increase and the 1.5% automatic annual increase of the originally granted annuity. Effective for fiscal year ended June 30, 2019 to fiscal year ending June 30, 2021, subsequently extended to fiscal year ending June 30, 2024 by PA 101-0010 (SB 1814) – Budget Implementation Bill.</p>

## Section 7: Assumptions, Benefit Provisions and Definitions

### Definitions of Terms

The following list defines certain technical terms for the convenience of the reader:

<b>Actuarial Accrued Liability for Actives:</b>	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
<b>Actuarial Accrued Liability for Pensioners:</b>	The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.
<b>Actuarial Cost Method:</b>	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the Actuarially Determined Contribution.
<b>Actuarial Gain or 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. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., TRS's assets earn more than projected, salary increases are less than assumed, participants retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
<b>Actuarially Equivalent:</b>	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
<b>Board-Adopted Actuarial Funding Policy:</b>	The term given to the Board's funding policy. The contribution determined under the Board-Adopted Actuarial Funding Policy is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability. The amortization of the unfunded accrued liability is a closed 20-year period effective June 30, 2015, and will decline by one year in each subsequent valuation. Sources of unfunded actuarial accrued liability that emerge in subsequent valuations are amortized over 20-year closed periods. Contributions toward the unfunded actuarial accrued liability increase by 2% each year, the estimate of increase in future State revenue growth. The actuarial cost method is the entry age method. The minimum contribution is the normal cost.



## Section 7: Assumptions, Benefit Provisions and Definitions

### Definitions of Terms *continued*

<b>Actuarial Present Value (APV):</b>	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <ol style="list-style-type: none"><li>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)</li><li>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and</li><li>Discounted according to an assumed rate (or rates) of return to reflect the time value of money.</li></ol>
<b>Actuarial Present Value of Future Plan Benefits(APV):</b>	<p>The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active participant, retired participants, beneficiaries receiving benefits, and inactive participants entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.</p>
<b>Actuarial Valuation:</b>	<p>The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).</p>
<b>Actuarial Value of Assets:</b>	<p>The value of the System's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.</p>
<b>Actuarially Determined:</b>	<p>Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.</p>
<b>Actuarially Determined Contribution (ADC):</b>	<p>The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Board's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.</p>

## Section 7: Assumptions, Benefit Provisions and Definitions

### Definitions of Terms *continued*

<b>Amortization Method:</b>	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active participants will increase.
<b>Amortization Payment:</b>	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
<b>Assumptions or Actuarial Assumptions:</b>	The estimates on which the cost of the System is calculated including: <ul style="list-style-type: none"><li>(a) Investment return — the rate of investment yield that the System will earn over the long-term future;</li><li>(b) Mortality rates — the death rates of employees and pensioners; life expectancy is based on these rates;</li><li>(c) Retirement rates — the rate or probability of retirement at a given age;</li><li>(d) Turnover rates — the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;</li><li>(e) Salary increase rates — the rates of salary increase due to inflation and productivity growth.</li></ul>
<b>Closed Amortization Period:</b>	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period.
<b>Decrements:</b>	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.
<b>Defined Benefit Plan:</b>	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
<b>Defined Contribution Plan:</b>	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
<b>Employer Normal Cost:</b>	The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.

## Section 7: Assumptions, Benefit Provisions and Definitions

### Definitions of Terms *continued*

<b>Experience Study:</b>	A periodic review and analysis of the actual experience of the System that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
<b>Funded Ratio:</b>	The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the fair value of assets (FVA), rather than the AVA, as another measure of the Plan's health.
<b>GASB 25 and GASB 27:</b>	Governmental Accounting Standards Board Statements No. 25 and No. 27. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 27 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 25 sets the rules for the systems themselves.
<b>GASB 67 and GASB 68:</b>	Governmental Accounting Standards Board Statements No. 67 and No. 68 are the successor statements to GASB Statements No. 25 and No. 27.
<b>Investment Return:</b>	The rate of earnings of the System from its investments, including interest, dividends, and capital gain and loss adjustments, computed as a percentage of the average value of the System. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
<b>Net Pension Liability (NPL):</b>	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
<b>Normal Cost:</b>	That portion of the Actuarial Present Value of plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
<b>Open Amortization Period:</b>	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount, or in relation to covered payroll, if the actuarial assumptions are realized.
<b>Plan Fiduciary Net Position:</b>	Fair value of assets.

## Section 7: Assumptions, Benefit Provisions and Definitions

### Definitions of Terms *continued*

<b>Total Pension Liability (TPL):</b>	The actuarially accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
<b>Unfunded Actuarial Accrued Liability (UAAL):</b>	The excess of the actuarial accrued liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
<b>Valuation Date or Actuarial Valuation Date:</b>	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

## Section 7: Assumptions, Benefit Provisions and Definitions

### History of Legislative Changes

The following list defines certain technical terms for the convenience of the reader:

The actuarial cost method utilized is the projected unit credit cost method, which became effective with the June 30, 1989 valuation. Administrative expenses have been a component of the normal cost rate since the June 30, 1994 valuation. The financing objective under Article 16 of the Illinois Pension Code is to meet the cost of maintaining and administering the system on a 90% funded basis by June 30, 2045. Following is a brief summary of the changes in funding requirements.

- Public Act 88-0593, enacted in 1994, established a fifty-year funding plan for fiscal years 1996 through 2045. It required a fifteen-year ramp period of gradually increasing State contributions followed by a 35-year period of State contributions at a level percent of pay.
- Public Act 90-0448, enacted in 1997, required the System's assets to be valued at fair value instead of book value.
- Public Act 90-0582, enacted in 1998, changed the defined benefit formula and added minimum state contribution rates in fiscal year 1999 that remained in effect through fiscal year 2004.
- Public Act 93-0002, enacted in 2003, provided pension obligation bond proceeds and placed upper limits on State contributions beginning with the State contribution due for fiscal year 2005.
- Public Act 94-0004, enacted in 2005, removed the money purchase formula for new hires, added new employer contributions for excess salary increases and sick leave, specified the level of state contributions for fiscal years 2006 and 2007, and required a return to the statutory funding plan in fiscal year 2008.
- Public Act 94-1057, enacted in 2006, contained exemptions from some of the new employer contribution requirements enacted in 2005.
- Public Act 96-0043, enacted in 2009, required the use of a smoothed actuarial value of assets beginning with the June 30, 2009 valuation.
- Public Act 96-0889, enacted in 2010, established Tier II provisions.
- Public Act 96-1511, enacted in 2011, required the state retirement systems to recertify their fiscal year 2011 state funding requirements and assume the Tier II benefits of Public Act 96-0889 were in effect on June 30, 2009.
- Public Act 97-0694, enacted in 2012, required the auditor general to hire an actuary to serve as the State Actuary.
- Public Act 98-0042, enacted in 2013, provided that the Early Retirement Option terminate on June 30, 2016. Due to the expiration of the program, active members become eligible for refunds of their early retirement contributions during fiscal year 2017.
- Public Act 98-0674, enacted in 2014 as part of the budget implementation bill, requires the state and federal contribution rates to TRS to be the same.

## Section 7: Assumptions, Benefit Provisions and Definitions

### History of Legislative Changes *continued*

- Public Act 99-0232, enacted in 2015, requires the actuaries of the state-funded retirement systems to conduct experience analyses every three years instead of every five years.
- Public Act 100-0023, enacted in 2017 as part of the budget implementation bill, creates a Tier III hybrid benefit plan.
- Public Act 100-0340, enacted in 2017, requires employer contributions from Federal funds to be based on the total employer normal cost rate instead of the State contribution rate, beginning July 1, 2017.
- Public Act 100-0587, enacted in 2018, creates two new buyout provisions for TRS members, an inactive vested buyout and an automatic annual increase buyout, which will exist until June 30, 2021.
- Public Act 101-0010, enacted in 2019, extends the Automatic Annual Increase and Inactive Vested buyouts through fiscal year ending June 30, 2024, in addition to repealing the 3% “FAS Cap” threshold (reverting back to 6% threshold).

A more complete history of legislative changes can be found at the following link:

<https://www.trsil.org/sites/default/files/documents/history.pdf>

5963278v12/04786.006