

Public School Teachers' Pension and Retirement Fund of Chicago

Actuarial Valuation Report as of June 30, 2021





October 25, 2021

Board of Trustees
Public School Teachers' Pension and Retirement Fund of Chicago
425 S. Financial Place, Suite 1400
Chicago, Illinois 60605-10000

**Re: Public School Teachers' Pension and Retirement Fund of Chicago Actuarial Valuation as of
June 30, 2021**

Dear Members of the Board:

The results of the June 30, 2021 Annual Actuarial Valuation of the Public School Teachers' Pension and Retirement Fund of Chicago (commonly known as the Chicago Teachers' Pension Fund, "CTPF" or "Fund") are presented in this report.

This report was prepared at the request of the Board and is intended for use by the Fund and those designated or approved by the Board. This report may be provided to parties other than the Fund only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the actuarial valuation are to measure the Fund's funding progress, and to determine the contribution requirements for the fiscal year beginning July 1, 2022, and ending June 30, 2023. The employer's contribution requirement has been determined in accordance with Illinois State Statutes, in particular under 40 ILCS Sections 5/17-127, 5/17-127.2, and 5/17-129. Information required by Governmental Accounting Standards Board ("GASB") Statement Nos. 67 and 68 is provided in a separate report. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

The contribution requirement in this report is determined using the actuarial assumptions and methods disclosed in Section G of this report. This report includes risk metrics beginning on page 17, but does not include a more robust assessment of the risks if future experience deviates from the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

This actuarial valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside the scope of this assignment and was not performed.

The findings in this report are based on data and other information through June 30, 2021. The actuarial valuation was based upon information furnished by CTPF staff, concerning Retirement Fund benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by CTPF staff.

This report was prepared using actuarial assumptions adopted by the Board as authorized under the Illinois Pension Code. The actuarial assumptions used for the June 30, 2021 actuarial valuation are based on an experience study for the five-year period from July 1, 2012 through June 30, 2017, and the 2021 Actuarial Assumption Study, performed by GRS. The investment return assumption was decreased from 6.75 percent to 6.50 percent effective for the June 30, 2021 actuarial valuation. There have been no other changes in actuarial assumptions since the last actuarial valuation. All actuarial assumptions used in this report are reasonable for the purposes of this actuarial valuation. Additional information about the actuarial assumptions is included in Section G of this report entitled Actuarial Methods and Assumptions.

The benefit provisions for members hired on or after January 1, 2011, were changed under Public Act 96-0889. Public Act 100-0023 created a third tier of benefits for new members provided that adoption by a resolution or ordinance occurs. Given this uncertainty, GRS has not valued the benefits provided under Public Act 100-0023. Members hired on or after this date and the assumed new hires in the projections were valued under Public Act 96-0889 benefit provisions.

Although the statutory contribution requirements were met, in our opinion the statutory funding method generates a contribution requirement that is less than a reasonable actuarially determined contribution ("ADC"). Meeting the statutory requirement does not mean that the undersigned agree that adequate actuarial funding has been achieved. We recommend the adherence to a funding policy, such as the Board policy used to calculate the ADC under GASB Statement Nos. 67 and 68, which funds the normal cost of the plan as well as an amortization payment that seeks to pay off 100 percent of the unfunded accrued liability over a closed period of 30 years, beginning July 1, 2013 (22 years remaining as of July 1, 2021, which determines the fiscal year 2022 ADC).

This report was prepared using our proprietary valuation model and related software and spreadsheet models used to calculate the statutory contributions in each future year through 2059 under the CTPF statutory funding policy. In our professional judgment, the models used have the capability to provide results that are consistent with the purposes of the actuarial valuation and have no material limitations or known weaknesses. We performed tests to ensure that the models reasonably represent that which is intended to be modeled.

This report reflects the impact of COVID-19 through June 30, 2021. However, this report does not reflect the longer term and still developing future impact of COVID-19, which is likely to further influence demographic experience and economic expectations. We will continue to monitor these developments and their impact on the Fund and the actuarial assumptions. Actual experience will be reflected in each subsequent annual valuation, as experience emerges.



This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge the information contained in this report is accurate and fairly presents the actuarial position of the CTPF as of the actuarial valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes.

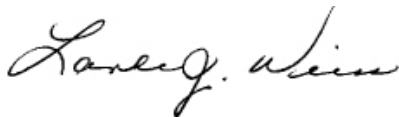
Lance J. Weiss and Amy Williams are Members of the American Academy of Actuaries and meet the American Academy of Actuaries Qualification Standards to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

Gabriel, Roeder, Smith & Company will be pleased to review this actuarial valuation and report with the Board of Trustees and to answer any questions pertaining to the actuarial valuation.

Respectfully submitted,

GABRIEL, ROEDER, SMITH & COMPANY



Lance J. Weiss, EA, MAAA, FCA
Senior Consultant and Team Leader



Amy Williams, ASA, MAAA, FCA
Senior Consultant

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SECTION A

EXECUTIVE SUMMARY

Executive Summary

Actuarial Valuation Date:	June 30, 2021	June 30, 2020
Required Employer Contributions for Fiscal Year Ending:	June 30, 2023	June 30, 2022
Estimated Required Employer Contributions:		
· Required Board of Education Contributions	\$ 537,396,000	\$ 653,694,000
· Additional Board of Education Contributions (0.58 percent of pay)	14,256,000	13,486,000
· Additional State Contributions (0.544 percent of pay)	13,371,000	12,649,000
· State Contributions Pursuant to P.A. 100-0465 (Normal Cost) ^a	295,302,000	264,848,000
· Total Required Employer Contributions	\$ 860,325,000	\$ 944,677,000
· Percentage of Projected Capped Payroll	35.002%	40.629%
Actuarial Valuation Date:	June 30, 2021	June 30, 2020
Actuarial Information for Fiscal Year Ending:	June 30, 2022	June 30, 2021
Actuarially Determined Contribution^b as of the Actuarial Valuation Date:		
· Annual Amount	\$ 1,278,954,307	\$ 1,219,857,317
· Percentage of Projected Capped Payroll for Upcoming Year	53.34%	53.80%
Membership:		
· Number of		
- Active Members ^c	31,215	30,091
- Members Receiving Payments	27,610	28,015
- Vested Former Members Eligible for Deferred Benefits	6,658	10,024
- Non-vested Former Members Eligible for Refunds Only	24,997	21,260
- Total	90,480	89,390
· Covered Payroll as of the Actuarial Valuation Date	\$ 2,396,432,788	\$ 2,262,053,256
· Projected Capped Payroll for Upcoming Year	\$ 2,397,752,804	\$ 2,267,288,286
· Projected Capped Payroll for Upcoming Year + 1	\$ 2,457,910,229	\$ 2,325,129,719
· Annualized Benefit Payments	\$ 1,506,016,014	\$ 1,488,748,930
Assets:		
· Market Value of Assets (MVA)	\$ 13,373,041,592	\$ 10,937,062,021
· Actuarial Value of Assets (AVA)	\$ 11,925,535,283	\$ 11,240,208,045
· Approximate Return on Market Value of Assets	27.47%	4.07%
· Approximate Return on Actuarial Value of Assets	10.78%	7.06%
· Ratio – Actuarial Value of Assets to Market Value of Assets	89.18%	102.77%
Basic Results:		
· Total Normal Cost Amount (Including Admin. Expenses)	\$ 442,198,528	\$ 399,729,564
· Employer's Normal Cost Amount (Including Admin. Expenses)	\$ 226,400,776	\$ 195,673,618
· Employer's Normal Cost Amount (Including Admin. Expenses and Health Insurance Subsidy) ^d	\$ 291,400,776	\$ 260,673,618
· Actuarial Accrued Liability (AAL)	\$ 25,117,988,742	\$ 24,073,482,607
· Unfunded Actuarial Accrued Liability (UAAL)	\$ 13,192,453,459	\$ 12,833,274,562
· Funded Ratio based on Actuarial Value of Assets	47.48%	46.69%
· UAAL as % of Covered Payroll	550.50%	567.33%
· Funded Ratio based on Market Value of Assets	53.24%	45.43%

^a State Normal Cost contribution represents the projected employer Normal Cost for fiscal years 2022 and 2023, including \$65 million for the health insurance subsidy.

^b The policy adopted by the Board calculates the Actuarially Determined Contribution (ADC) as the Normal Cost plus a 30-year level percent of payroll closed-period (beginning June 30, 2013) amortization of the Unfunded Accrued Liability. As of June 30, 2021, the remaining amortization period is 22 years. The ADC is used for financial reporting purposes only.

^c Active count excludes members expected to be hired to replace retirements and terminations that occurred in June.

^d Used for calculation of the ADC.



SECTION B

SUMMARY OF THE ACTUARIAL VALUATION

Summary of the Actuarial Valuation

Introduction

The law governing the Public School Teachers' Pension and Retirement Fund of Chicago requires the Actuary, as the technical advisor to the Board of Trustees, to determine the amount of Board of Education contributions required for each fiscal year.

“The Board Shall determine the amount of Board of Education contributions required for each fiscal year on the basis of the actuarial tables and other assumptions adopted by the Board and the recommendations of the actuary, in order to meet the minimum contribution requirements of subsections (a) and (b). Annually, on or before February 28, the Board shall certify to the Board of Education the amount of the required Board of Education contribution for the coming fiscal year. The certification shall include a copy of the actuarial recommendations upon which it is based. (40 ILCS Section 5/17 - 129(c)).”

Gabriel, Roeder, Smith & Company has been retained by the CTPF Board of Trustees to perform an actuarial valuation as of June 30, 2021. In this report, we present the results of the actuarial valuation and the appropriation requirements under Public Act 96-0889, Public Act 90-0655, Public Act 91-0357 and Public Act 100-0465 for the fiscal year ending June 30, 2023.

Accounting information required by GASB Statement Nos. 67 and 68 is provided in a separate report.

The actuarial valuation was completed based upon membership and financial data provided by the administrative staff of the CTPF. The cost method used to determine the benefit liabilities for statutory funding is the Projected Unit Credit Cost Method as required by statute. For actuarial valuation purposes, as well as for projection purposes, the actuarial value of assets is based on a four-year smoothing method.

Assumptions and Methods

The actuarial assumptions used for the June 30, 2021, actuarial valuation were adopted by the Board during the September 23, 2021, Board meeting, and were based on the recommendations from the 2021 Actuarial Assumptions Study. The changes in actuarial assumptions include:

- Decreased the investment return assumption from 6.75 percent to 6.50 percent.

All other actuarial assumptions remain unchanged from the previous actuarial valuation and were adopted by the Board (including CPS' requested modifications) during the September 20, 2018 Board meeting, and were based on the recommendations from the experience study for the five-year period from July 1, 2012 through June 30, 2017, and the requested modifications of Chicago Public Schools (“CPS”).

The actuarial assumptions can be found in Section G of the report.

Report Highlights

The employer's statutory contribution requirement for FY 2023 is \$860.3 million. The 2020 actuarial valuation had projected the employer statutory contribution would increase from \$944.7 million for FY



Summary of the Actuarial Valuation

2022 to \$966.9 million for FY 2023. The key reason for the \$106.6 million decrease in the employer's statutory contribution requirement of \$860.3 million over the projected amount from the prior actuarial valuation of \$966.9 million is the favorable investment experience on the market value of assets, which in total, offset the increase in the contribution due to the change in the investment return assumption. The State's portion of the total statutory contribution increased due to the assumption change and increase in projected payroll. However, because the majority of the Board of Education's contribution is for the unfunded liability (in order to attain a funded ratio of 90 percent by 2059), the favorable investment experience offset the increases due to the assumption change and increase in projected payroll, and resulted in a net decrease in the Board of Education's statutory contribution requirement.

Over the past 10 years, CTPF experienced investment gains on a market value basis compared to the actuarial assumption in fiscal years 2013, 2014, 2017, 2018 and 2021 and investment losses in fiscal years 2012, 2015, 2016, 2019 and 2020. The return on market value for the year ending June 30, 2021, was approximately 27.47 percent compared to a return of 4.07 percent in FY 2020. The average market value investment return over the most recent 10 years has been approximately 8.82 percent. Table 10 on page 38 provides historical investment returns (on an MVA and AVA basis) over the past 25 years.

The funded ratio increased from 45.4 percent as of June 30, 2020 to 53.2 percent as of June 30, 2021, based on the market value of assets, and increased from 46.7 percent as of June 30, 2020, to 47.5 percent as of June 30, 2021, based on the actuarial value of assets. There are net deferred asset gains of \$1,452.2 million which will be recognized in the actuarial value of assets over the next three years.

The funded ratio and unfunded actuarial accrued liability are useful for assessing the need for and amount of future contributions other than normal cost contributions. They are not appropriate, however, for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

Experience during 2021

The Fund assets earned approximately 27.47 percent on a market value basis during FY 2021 which was greater than the investment return assumption of 6.75 percent for FY 2021. The Fund assets earned approximately 10.78 percent on an actuarial value of assets basis during FY 2021, due to recognition of net deferred investment gains under the asset smoothing method. Since 10.78 percent is greater than the assumed rate of investment return of 6.75 percent for FY 2021, there was an asset gain of \$474.81 million on the actuarial value of assets.

There was also a net gain of \$117.73 million from actuarial liabilities, which is comprised of a gain of approximately \$71.33 million from demographic experience, and a gain of \$46.40 million from lower than expected pay increases.



Summary of the Actuarial Valuation

The total gain from liabilities for the Fund is calculated as follows (dollars in millions):

1. Actuarial Accrued Liability ("AAL") - Prior Year (Pensions Only)	\$	24,073.48
2. Total Normal Cost - Prior Year ^a		399.73
3. Benefits and Administrative Expenses Paid in FY 2021 ^b		(1,551.91)
4. Interest on the above items, 1, 2 and 3		1,586.71
5. Expected AAL 06/30/2021 (1+2+3+4)		24,508.01
6. Impact of Change in Actuarial Assumptions and Methods		727.71
7. Expected AAL 06/30/2021 After Assumption Changes (5+6)		25,235.72
8. Actual AAL 06/30/2021		25,117.99
9. Actuarial (Gain)/Loss on Liabilities (8-7) (Pensions Only)	\$	(117.73)

^aTotal Normal Cost from the previous actuarial valuation includes both employee and employer portion. The employee portion is based on actual contributions.

^bIncludes refund of insurance premiums.

Numbers may not add due to rounding.

CTPF experienced an overall actuarial gain of \$592.54 million. The total net actuarial gain is the total of the gain from assets and the net gain from liabilities. The total actuarial gain for the year is as follows (dollars in millions):

1. Actuarial (Gain)/Loss on Assets	\$	(474.81)
2. Actuarial (Gain)/Loss on Liabilities		(117.73)
3. Total Actuarial (Gain)/Loss (1+2)		(592.54)

The experience of the population determines the liability gain or loss for the year. There was a gain on salaries, due to lower salary increases than assumed. From the last year to this year, there were small gains or losses on retirement, disability experience and active mortality. There was a gain due to termination experience and retiree and deferred experience, and there was a new entrant loss. New entrant losses will occur each year but are offset by additional contributions to the assets. Deviations from other assumptions generated a small actuarial loss.

See Table 4 (page 24), Section C, for detail of the gains and losses by source.

Asset Information

The market value of the assets of the Fund that are available for benefits increased from \$10,937.1 million as of June 30, 2020, to \$13,373.0 million as of June 30, 2021. The actuarial value of assets as of June 30, 2021, is \$11,925.5 million, which is \$1,447.5 million lower than the market value of assets. Twenty-five percent of the gains and losses based on the difference between the actual market value investment return and the expected return on the actuarial value of assets are recognized each year. There are net deferred asset gains of \$1,452.2 million which will be recognized in the actuarial value of



Summary of the Actuarial Valuation

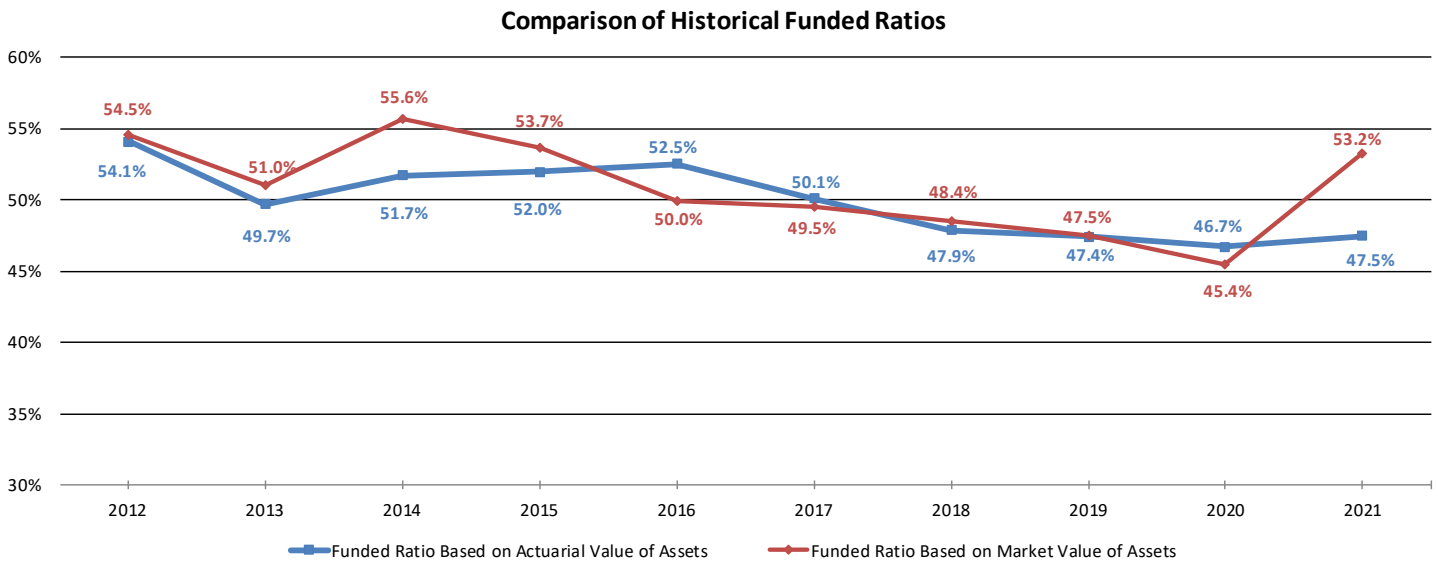
assets over the next three years (a \$422.7 million gain in FY 2022, a \$477.3 gain in FY 2023 and a \$552.2 million gain in FY 2024).

The detailed determinations of asset values utilized in this valuation and the change in assets in the last year are set out in Section E.

Funding Status

The funding status of CTPF is measured by the Funded Ratio. The Funded Ratio is the ratio of the assets available for benefits compared to the actuarial accrued liability of the Fund. Thus, it reflects the portion of benefits earned to date by CTPF members, which are covered by current Fund assets. A funded ratio of 100 percent means that all of the benefits earned to date by CTPF members are covered by assets. By monitoring changes in the funded ratio each year we can determine whether or not funding progress is being made.

Below is a comparison of funded ratios determined on a market value basis and an actuarial value basis over the last 10 years.



Appropriation Requirements under P.A. 90-0655, P.A. 91-0357, P.A. 96-0889 and P.A. 100-0465

The law governing the Fund under P.A. 96-0889 provides that:

For fiscal years 2014 through 2059, the minimum contribution to the Fund to be made by the Board of Education in each fiscal year shall be an amount determined by the Fund to be sufficient to bring the total assets of the Fund up to 90 percent of the total actuarial liabilities of the Fund by the end of fiscal year 2059. In making these determinations, the required Board of Education contribution shall be calculated each year as a level percentage of the applicable employee payrolls over the years remaining to and including fiscal year 2059 and shall be determined under the Projected Unit Credit actuarial cost method. Beginning in fiscal year 2060, the minimum Board of Education contribution for each fiscal year shall be the amount needed to maintain the total assets of the Fund at 90 percent of the total actuarial liabilities of the Fund.

The above calculation provides the basis for calculating the appropriation requirements under P.A. 96-0889. Beginning in State fiscal year 1999, P.A. 90-0655 provides additional State contributions of 0.544 percent of the Fund's total teacher payroll to the Fund to offset the portion of the cost of benefit increases enacted under P.A. 90-0582, except that no additional contributions are required if the Board has certified in the previous fiscal year that the Fund is at least 90 percent funded.

Pursuant to P.A. 91-0357, beginning on and after July 1, 1999, the Board of Education shall make additional contributions of 0.58 percent of the Fund's total teacher payroll to the Fund to offset the portion of the cost of benefit increases enacted under P.A. 90-0582, except that no additional contributions are required if the Board has certified in the previous fiscal year that the Fund is at least 90 percent funded.

Pursuant to P.A. 100-0465, beginning with fiscal year 2018, the State shall contribute for each fiscal year an amount to be determined by the Fund, equal to the employer normal cost for that fiscal year, plus the retiree health insurance reimbursement subsidy. In addition, the Board of Education's property tax levy capped rate was increased from 0.383 percent to 0.567 percent, with proceeds dedicated solely for CTPF.

According to Section 17-129(b)(vii) of the Illinois Pension Code, any contribution by the State to or for the benefit of the Fund, shall be a credit against any contribution required to be made by the Board of Education.



Employer Contribution Requirement for Fiscal Year 2023

The funded ratio as of the June 30, 2021 actuarial valuation on an actuarial value basis is 47.5 percent. Therefore, additional contributions by the Board of Education and the State will be required for fiscal year 2023. The projected payroll for fiscal year 2023 is \$2,457,910,229. Based on the projected payroll for fiscal year 2023, and the additional State and Board of Education contribution rates of 0.544 percent and 0.58 percent of payroll, respectively, the additional State and Board of Education contributions for fiscal year 2023 are as follows:

Development of Additional Contributions under Section 17-127 and 17-127.2 of the Illinois Pension Code	Fiscal Year 2023	Fiscal Year 2022
Projected Total Capped Payroll	\$ 2,457,910,229	\$ 2,325,129,719
Additional State Contributions under Section 17-127 of the Illinois Pension Code (% of Projected Capped Payroll)	\$ 13,371,000 0.544%	\$ 12,649,000 0.544%
Additional Board of Education Contributions under Section 17-127.2 of the Illinois Pension Code (% of Projected Capped Payroll)	\$ 14,256,000 0.580%	\$ 13,486,000 0.580%

Pursuant to P.A. 100-0465, the State shall contribute for each fiscal year an amount to be determined by the Fund, equal to the employer normal cost for that fiscal year, plus the retiree health insurance reimbursement subsidy. The following table provides the development of the State contribution requirement under P.A. 100-0465:

Development of Normal Cost State Contributions under Section 17-127(d)(1) of the Illinois Pension Code	Fiscal Year 2023	Fiscal Year 2022*
Total Normal Cost	\$ 426,888,000	\$ 418,911,000
Projected Administrative Expenses	24,626,000	23,287,000
Total Normal Cost Including Administrative Expenses	\$ 451,514,000	\$ 442,199,000
Expected Employee Contributions	221,212,000	215,798,000
Employer Normal Cost	\$ 230,302,000	\$ 226,401,000
Health Insurance Subsidy	65,000,000	65,000,000
State Contributions under Section 17-127(d)(1) of the Illinois Pension Code	\$ 295,302,000	\$ 291,401,000

**Based on June 30, 2021 actuarial valuation results. Fiscal year 2022 numbers are presented for illustrative and comparative purposes only. They are only used to develop the Actuarially Determined Contribution (ADC). Numbers may not add due to rounding.*



Employer Contribution Requirement for Fiscal Year 2023

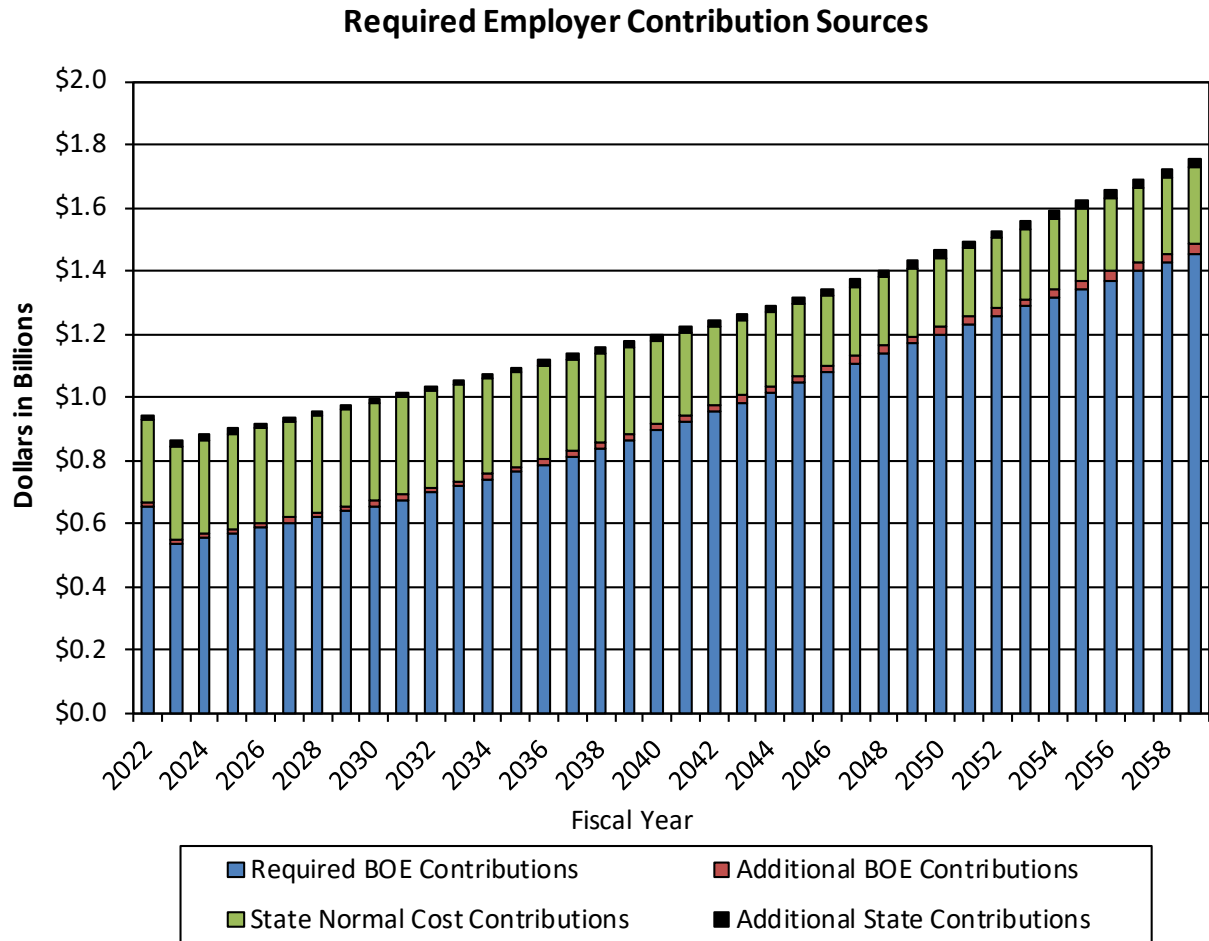
Pursuant to P.A. 96-0889, the Board of Education contribution requirement in each fiscal year shall be an amount determined by the Fund to be sufficient to bring the total assets of the Fund up to 90 percent of the total actuarial liabilities of the Fund by the end of fiscal year 2059. In making these determinations, the required Board of Education contribution shall be calculated each year as a level percentage of the applicable employee payrolls over the years remaining to and including fiscal year 2059 and shall be determined under the Projected Unit Credit actuarial cost method. Based on the funding projections provided in Section D of this report, the Board of Education's required contribution for fiscal year 2023 is equal to \$537,396,000, (net of Additional State and Board of Education Contributions).

The fiscal year ending June 30, 2022 and June 30, 2023 certified contribution requirements and projected future year required contribution amounts are shown below:

Fiscal Year Ending June 30,	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contributions
2022	\$ 653,694,000	\$ 13,486,000	\$ 12,649,000	\$ 264,848,000	\$ 944,677,000
2023	537,396,000	14,256,000	13,371,000	295,302,000	860,325,000
2024	552,798,000	14,584,000	13,679,000	299,061,000	880,122,000
2025	568,814,000	14,910,000	13,984,000	302,067,000	899,775,000
2026	585,156,000	15,229,000	14,284,000	304,384,000	919,053,000
2027	602,081,000	15,551,000	14,585,000	306,247,000	938,464,000
2028	619,576,000	15,870,000	14,885,000	307,415,000	957,746,000
2029	637,626,000	16,187,000	15,182,000	307,870,000	976,865,000
2030	656,397,000	16,505,000	15,481,000	307,701,000	996,084,000
2031	675,917,000	16,828,000	15,784,000	307,032,000	1,015,561,000
2032	696,351,000	17,157,000	16,092,000	305,822,000	1,035,422,000

Employer Contribution Requirement for Fiscal Year 2023

The following graph details the projected employer contribution requirements by Source for fiscal years 2022 through 2059.



Method of Calculation for Appropriation Requirements

The actuarial valuation results are based on the Projected Unit Credit actuarial cost method, the data provided and actuarial assumptions used for the June 30, 2021 actuarial valuation. In order to determine projected contribution amounts, the following additional assumptions were used:

- Total employer contributions of \$944,677,000 for fiscal year 2022.
- Administrative expenses of \$17,657,211 for fiscal year 2021, as provided by the Fund. For fiscal year 2022, the budgeted administrative expense amount of \$23,287,480, as provided by Staff. Thereafter, administrative expenses are assumed to increase 5.75 percent annually for the first 14 years and then increase in line with projected capped payroll after 14 years.
- New entrants whose average age is 32.99 and average capped (pensionable) pay is \$50,757 (2021 dollars).
- The active member population is assumed to remain level at 31,241 (includes 26 expected new hires) for all years of the 38-year projection. The projection is based on assuming that new active members are hired to replace the current members who leave active membership (through termination, retirement, death or disability). As shown in Table 12 on page 42, the number of active members decreased by about 10 percent between 2008 and 2017, which is an average annualized decrease of about 1.0 percent. The number of actives increased in 2018 (albeit by less than one percent) and increased again in 2019, 2020 and 2021 by 1.2 percent, 2.7 percent and 3.7 percent, respectively. We will continue to review the assumption regarding the projected active member population annually.
- Projected benefits for members hired on or after January 1, 2011, are based on the new provisions established in P.A. 96-0889.
- Additional State contributions of 0.544 percent of pay are assumed to occur mid-year.
- State contributions of the employer's normal cost (includes administrative expenses and \$65 million health insurance subsidy) are assumed to occur mid-year.
- Additional Board of Education contributions of 0.58 percent of pay are assumed to occur end of year.
- A portion of the Board of Education's previous year's special tax levy is assumed to occur March of each year. The payments made through March 31 (which are assumed to be paid on March 1 on average) as provided by CTPF is equal to \$245,254,621 in fiscal year 2021 and is assumed to increase three percent per year.
- The remaining Board of Education required contribution is assumed to occur end of year.

The average increase in total uncapped payroll for the 38-year projection period is approximately 2.75 percent per year. It is important to note that benefits for new hires are based on capped payroll which is ultimately projected to grow at 1.125 percent per year. All results in this actuarial valuation assume that employer contributions will be made on capped pay.



Recommendations and Future Considerations

Measuring the statutory contribution against a policy such as the Actuarially Determined Contribution (“ADC”) helps evaluate the funding adequacy of the current statutory funding method. Therefore, the Board adopted a policy to calculate the ADC. Under this policy, the ADC is calculated as the Normal Cost plus a 30-year level percent of payroll closed-period amortization of the Unfunded Accrued Liability as of June 30, 2013. The remaining amortization period as of June 30, 2021, actuarial valuation is 22 years.

A key objective of the ADC is to accrue costs over the working lifetime of plan members to ensure that benefit obligations are satisfied and intergenerational equity is promoted. The ADC is used in the Schedule of Contributions for accounting purposes under GASB 67 and 68. In addition, the ADC could represent a reasonable annual funding target and therefore is used by some plan sponsors as their “de facto” funding requirement. Note that the statutory funding policy differs significantly from the ADC approach, and results in “back-loading,” meaning that contributions are deferred into the future. Back-loading could result in an underfunding of the fund.

The ADC for fiscal years 2021 and 2022, as well as the statutory employer contribution for fiscal years 2021 and 2022, are shown below as a percentage of projected capped payroll. The ADC for 2021 and statutory employer contribution for 2022 are based on the results of the June 30, 2020, actuarial valuation.

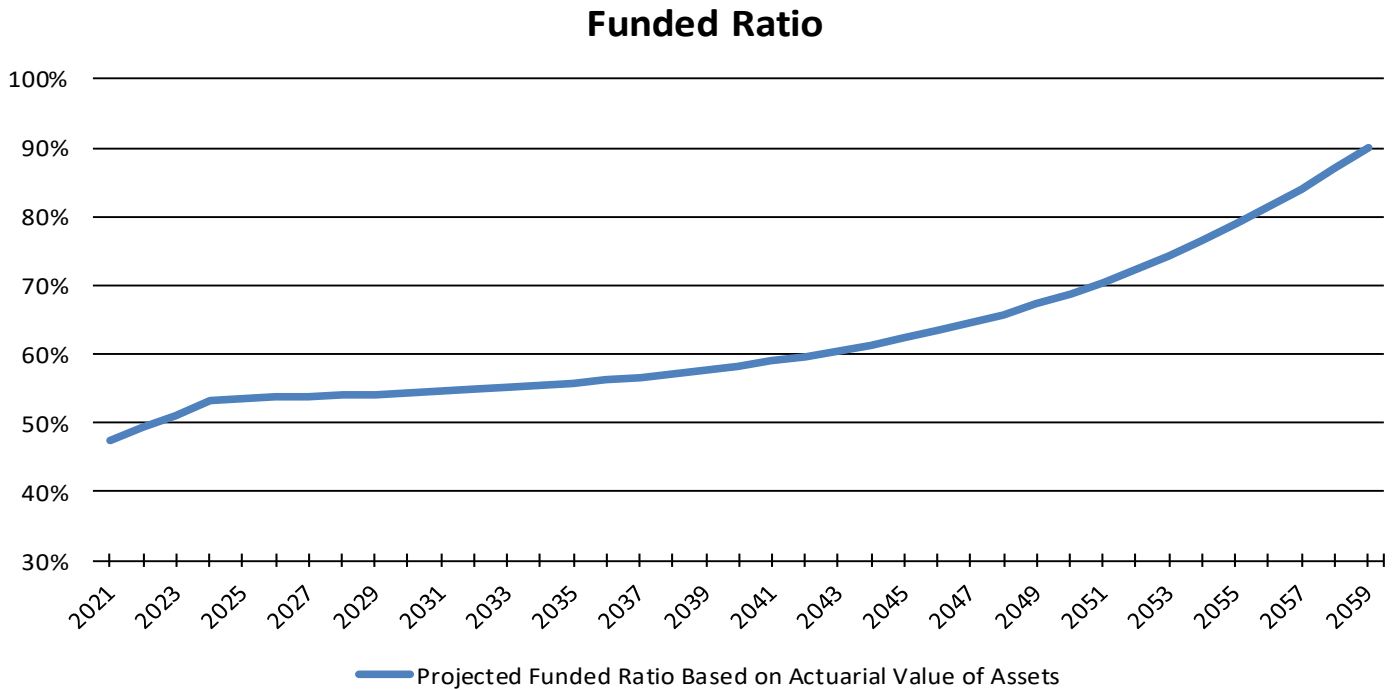
Actuarial Valuation Date:	June 30, 2021	June 30, 2020
Actuarially Determined Contributions for Fiscal Year Ending:	June 30, 2022	June 30, 2021
1. Actuarial Accrued Liability	\$ 25,117,988,742	\$ 24,073,482,607
2. Actuarial Value of Assets	\$ 11,925,535,283	\$ 11,240,208,045
3. Unfunded Actuarial Accrued Liability (1. – 2.)	\$ 13,192,453,459	\$ 12,833,274,562
4. Employer Normal Cost (Including Administrative Expenses and Health Insurance Subsidy)	\$ 291,400,776	\$ 260,673,618
5. Employer Normal Cost Adjusted for Contribution Timing	\$ 296,285,737	\$ 264,917,480
6. Amount to Amortize the Unfunded Liability over a 30-year Closed-period, Beginning July 1, 2013, as a Level Percentage of Payroll	<u>\$ 982,668,570</u>	<u>\$ 954,939,837</u>
7. Actuarially Determined Contribution Requirement [5. + 6.]	\$ 1,278,954,307	\$ 1,219,857,317
8. Projected Capped Payroll For Fiscal Year	\$ 2,397,752,804	\$ 2,267,288,286
9. Actuarially Determined Contribution as a Percentage of Projected Capped Payroll [7./8.]	53.34%	53.80%
10. Total Required Employer Contribution Including Health Insurance Subsidy	\$ 944,677,000	\$ 885,894,000
11. Total Required Employer Contribution as a Percentage of Projected Capped Payroll [10./8.]	39.40%	39.07%
12. Total Required Employer Contribution as a Percentage of Actuarially Determined Contribution [10./7.]	73.86%	72.62%

The fiscal year 2022 Actuarially Determined Contribution is based on an amortization factor which reflects 22 years remaining in the amortization period, an interest rate of 6.50 percent, an annualized assumed rate of increase in total capped payroll of 2.00 percent (which is consistent with the projected increase in total payroll from the projections used to calculate the statutory contribution requirements). The Employer Normal Cost and Amortization Payment are adjusted for expected contribution timing.



Recommendations and Future Considerations

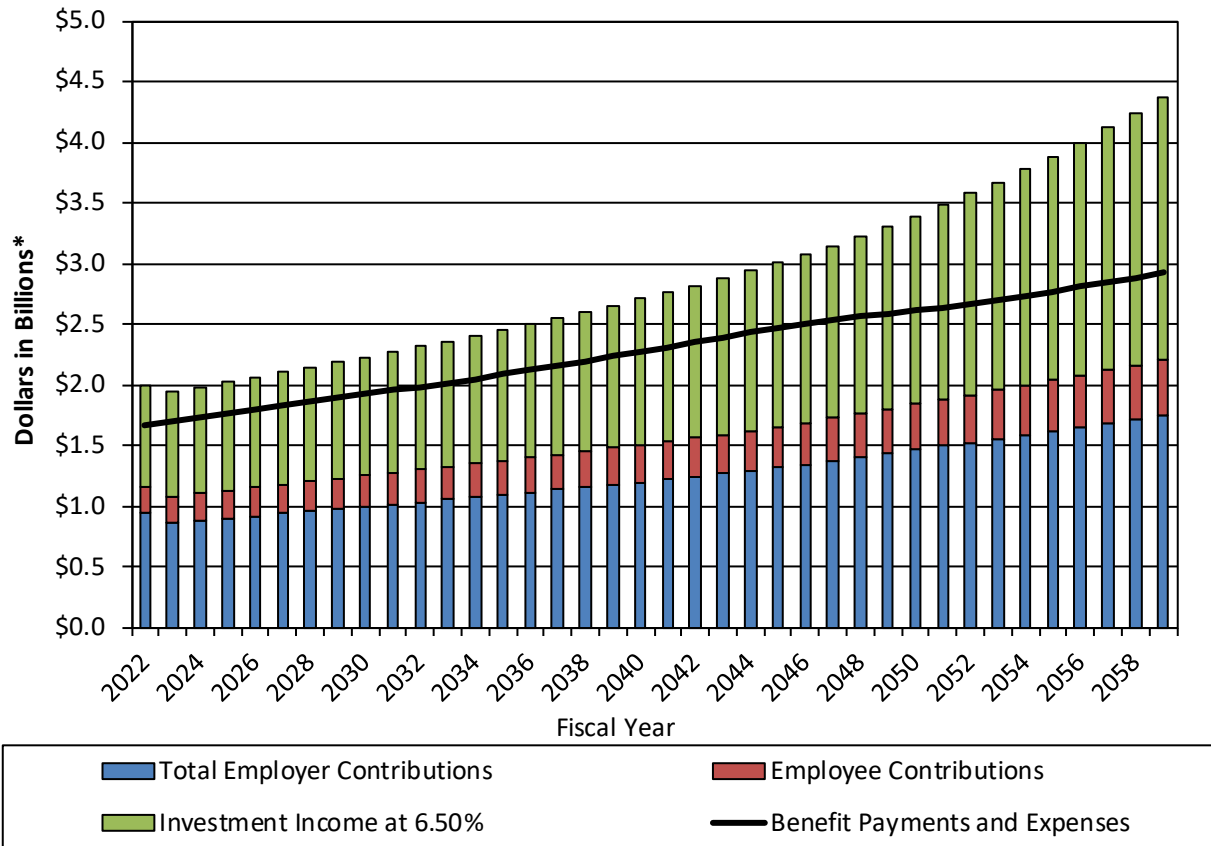
The statutory funding policy required for CTPF provides for level percent of pay funding that produces a funding target of 90 percent by 2059, assuming an open group projection. The following graph shows the projected funded ratio. A key observation is that the funded ratio does not grow markedly until after 2039. That is, a majority of the funding occurs between 2040 and 2059. This illustrates how significantly the current funding policy defers or back-loads contributions into the future.



Recommendations and Future Considerations

The following graph compares the projected benefits and expenses against employer contributions, employee contributions and investment income. From 2022 to 2059, the percentage of investment income needed to pay ongoing benefits decreases from 60.9 percent to 33.1 percent. This implies that a lower level of investment income is projected to be available for potential asset growth in the beginning of the projection period.

Comparison of Cash Flows



**Future dollar amounts are based on assumed inflationary increases.*

We are concerned about potential cash flow problems for CTPF. This is because the assets in the plan (\$13,373.0 million on a market value basis) are not sufficient to cover current retiree liabilities (\$17,555.5 million) and the ratio of market value of assets to retiree benefit payments and expenses is approximately 8.6. This means that approximately eight to nine years of retiree benefit payments can be paid from current assets; the ability to make such payments beyond that period is heavily dependent upon future employer contributions and future investment return.

Recommendations and Future Considerations

The calculations in this report were prepared based on the methods required by the statutory funding policy. GRS does not endorse this funding policy because the statutory funding policy defers funding for these benefits into the future and places a higher burden on future generations of taxpayers.

We recommend the following changes:

1. Implementing a funding policy that contributes normal cost plus closed period amortization as a level percentage of capped payroll amortization of the unfunded liability. (A policy which recognizes the unfunded liability at the valuation date and not a projected liability in the year 2059.)
2. Changing the actuarial cost method for calculating liabilities from the Projected Unit Credit to the Entry Age Normal method.

Change Funding Policy to a More Actuarially Sound Funding Method

We recommend a funding policy that contributes normal cost plus closed period amortization as a level percentage of capped payroll for paying off the current unfunded accrued liability (i.e., the amortization period declines by one year with each actuarial valuation) such that the funded ratio is projected to be 100 percent funded in 30 years or sooner. A 30-year closed amortization period (at the actuarial valuation as of June 30, 2013) methodology pays off the unfunded accrued liability in full by the end of the 30-year period in 2043. The fiscal year 2022 contribution would be \$1,279.0 million under this funding policy. The current statutory contribution does not comply with this recommendation.

Underfunding the Fund creates the risk that ultimately benefit obligations cannot be met from the trust, and will require a greater amount of funding from other City and State resources. In addition, continually underfunding the Fund also creates more of a funding need from contributions and less is available from investment return – thereby creating a more expensive plan.

Change the Actuarial Cost Method to the Entry Age Normal Method

The current actuarial cost method is the Projected Unit Credit method, which is required by statute. The Projected Unit Credit method recognizes costs such that the normal cost for an individual member increases as a percentage of payroll throughout the member's career. The Entry Age Normal cost method is the most commonly used method in the public sector. It is also the method required to be used for financial reporting under GASB Statement Nos. 67 and 68. The Entry Age Normal method recognizes costs as a level percentage of payroll over a member's career. We recommend a change to the Entry Age Normal method.

We recognize that the State Statute governs the funding policy of the Fund. The purpose of these comments is to highlight the difference between the statutory appropriation methodology and an actuarially sound funding policy and to highlight the risks and additional costs of continuing to underfund the Fund.



Recommendations and Future Considerations

Future Considerations

Changes (such as the addition of a new benefit tier and delaying the 90 percent funding target year from 2045 to 2059) have had the effect of reducing the statutory contribution amounts that would have otherwise been made. However, recent changes in the investment return assumption and other demographic assumption changes to more closely align the actuarial assumptions with current market expectations have increased the contribution amounts that would otherwise have been made. Assuming the statutory contributions are received (and the actuarial assumptions are met including a 6.50 percent investment rate of return, each year through 2059) CTPF is currently projected to have contributions sufficient to increase the funded ratio from the current level of 47.5 percent to 90.0 percent by 2059.

This is a severely underfunded plan and the ability of the plan to reach 90 percent funding by 2059 is heavily dependent on the State and the Board of Education contributing the statutory contributions each and every year until 2059. Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. A determination regarding whether or not the plan sponsor is actually able to do so is outside the scope of this assignment and was not performed.

Number of Projected Future Active Members

The total required employer contribution is based on performing an open group projection through the year 2059. The projection is based on assuming that new active members are hired to replace the current members who leave active membership (through termination, retirement, death or disability). As shown in Table 12 on page 42, the number of active members decreased by about 10 percent between 2008 and 2017, which is an average annualized decrease of about 1.0 percent. The number of actives increased in 2018 (albeit by less than one percent) and increased again in 2019, 2020 and 2021 by 1.2 percent, 2.7 percent and 3.7 percent, respectively.

Currently, the actuarial valuation assumes that the total number of active members in the future will be equal to the number active in the current actuarial valuation. Although there is only four years of experience where the number of active members has increased, we believe that it is reasonable to maintain the current level future active member population assumption, but continue to annually monitor the number of active members in the coming years.

Actuarial Standards of Practice (ASOP) No. 4 Disclosures

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 6.50 percent on the actuarial value of assets), it is expected that:

1. The combined State and BOE contribution rate will be level as a percentage of payroll through 2059 (after all deferred asset gains and losses are fully recognized);



Recommendations and Future Considerations

2. The unfunded liability will decrease in dollar amount for fiscal years 2023 and 2024, then increase through 2039 before it begins to decrease;
3. The unfunded actuarial accrued liabilities will never be fully amortized; and
4. The funded status of the plan will increase gradually towards a 90 percent funded ratio in 2059.

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regard to any funded status measurements presented in this report:

1. The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations; in other words, of transferring the obligations to a unrelated third party in an arm's length market value type transaction.
2. The measurement is dependent upon the actuarial cost method which, in combination with the plan's amortization policy, affects the timing and amounts of future contributions. The amounts of future contributions will most certainly differ from those assumed in this report due to future actual experience differing from assumed experience based upon the actuarial assumptions.
3. A funded status measurement in this report of 100 percent is not synonymous with no required future contributions. If the funded status were 100 percent, the plan would still require future normal cost contributions (i.e., contributions to cover the cost of the active membership accruing an additional year of service credit).
4. The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets.

Limitation of Project Scope

Actuarial standards do not require the actuary to evaluate the ability of the plan sponsor or other contributing entity to make required contributions to the plan when due. Such an evaluation was not within the scope of this project. Consequently, the actuary performed no such evaluation.

Risks Associated with Measuring the Accrued Liability and Total Required Employer Contribution

The determination of the accrued liability and the total required employer contribution requires the use of actuarial assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the actuarial assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the total required employer contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Fund's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

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

1. **Investment risk** – actual investment returns may differ from the expected returns;
2. **Asset/Liability mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. **Contribution risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the Fund's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll or other relevant contribution base;
4. **Salary and Payroll risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. **Longevity risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. **Other demographic risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The statutory contribution for fiscal year 2023 shown on page 8 should be considered as the minimum contribution that complies with the funding policy governed by State statute (Section 17-129(b)(vi) of the Illinois Pension Code). The timely receipt of the statutory contribution is critical to support the financial

Risks Associated with Measuring the Accrued Liability and Total Required Employer Contribution

health of the Fund. Users of this report should be aware that contributions made at the statutorily determined amount do not necessarily guarantee benefit security.

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2021	2020
Ratio of the Market Value of Assets to Payroll	5.58	4.84
Ratio of Actuarial Accrued Liability to Payroll	10.48	10.64
Ratio of Actives to Retirees and Beneficiaries	1.13	1.07
Ratio of Net Cash Flow to Market Value of Assets	-3.74%	-4.94%

Ratios exclude inactive members not receiving benefits.

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 5.0 times the payroll, a return on assets 5 percent different than assumed would equal 25 percent of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100 percent is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 11 times the payroll, a change in liability 2 percent other than assumed would equal 22 percent of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.



Risks Associated with Measuring the Accrued Liability and Total Required Employer Contribution

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability. At the Board's request, we conducted additional risk assessment of investment and contribution risk through stress testing the investment return assumption and future active population growth.

SECTION C

ACTUARIAL DETERMINATIONS

Table 1

Results of Actuarial Valuation as of June 30, 2021

1. Number of Members		
a. Active ^a		31,215
b. Inactive:		
i. Eligible for deferred vested pension benefits		6,658
ii. Eligible for return of contributions only		24,997
c. Current Benefit Recipients:		
i. Retirement annuities		23,877
ii. Survivor annuities		3,288
iii. Disability annuities		445
d. Total		90,480
2. Covered Payroll		
a. As of the Actuarial Valuation Date	\$	2,396,432,788
b. Projected Capped Payroll for Fiscal Year 2022		2,397,752,804
c. Projected Capped Payroll for Fiscal Year 2023		2,457,910,229
3. Annualized Benefit Payments Currently Being Made		
a. Retirement annuities	\$	1,402,209,485
b. Survivor annuities		85,279,477
c. Disability annuities		18,527,052
d. Total	\$	1,506,016,014
4. Actuarial Accrued Liability—Annuitants		
a. Current Benefit Recipients:		
i. Retirement annuities	\$	16,572,798,040
ii. Survivor annuities		770,402,785
iii. Disability annuities		212,321,758
b. Total	\$	17,555,522,583
5. Actuarial Accrued Liability—Inactive Members		
a. Eligible for Deferred Vested Pension Benefits	\$	438,195,245
b. Eligible for Return of Contributions Only		134,140,860
c. Total	\$	572,336,105

^a Active count excludes 26 members expected to be hired to replace retirements and terminations that occurred in June 2021.



Table 1 (Continued)

Results of Actuarial Valuation as of June 30, 2021

	Normal Cost	Actuarial Accrued Liability
6. Active Members		
a. Retirement Benefits	\$ 321,209,145	\$ 5,968,133,484
b. Withdrawal	83,943,873	831,427,839
c. Death Benefits	5,643,769	81,225,938
d. Disability	8,114,261	109,342,793
e. Administrative Expenses	23,287,480	-
f. Total	\$ 442,198,528	\$ 6,990,130,054
7. Total Actuarial Accrued Liability (4. + 5. + 6.)		\$ 25,117,988,742
8. Market Value of Assets (MVA)		\$ 13,373,041,592
9. Unfunded Actuarial Accrued Liability Based on MVA (7. – 8.)		\$ 11,744,947,150
10. Funded Percentage Based on MVA (8. ÷ 7.) ^a		53.24%
11. Actuarial Value of Assets (AVA)		\$ 11,925,535,283
12. Unfunded Actuarial Accrued Liability Based on AVA (7. – 11.)		\$ 13,192,453,459
13. Funded Percentage Based on AVA (11. ÷ 7.) ^a		47.48%
14. Total Normal Cost	\$ 442,198,528	
15. Expected Employee Contributions	\$ 215,797,752	
16. Annual Employer Normal Cost (% of Projected Capped Payroll for Fiscal Year 2022)	\$ 226,400,776 9.44%	
17. Health Insurance Subsidy	\$ 65,000,000	
18. Annual Employer Normal Cost, including Health Insurance Reimbursement (16. + 17.) % of Projected Capped Payroll for Fiscal Year 2022 ^b	\$ 291,400,776 12.15%	

^a The funded status measure is appropriate for assessing the need for future contributions. The funded status is not appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.

^b Used for calculation of the ADC.



Table 2
Components of Actuarial Accrued Liability and Normal Cost by Tier

Actuarial Valuation Results	Tier 1		Tier 2 ^a		Total	
1. Count	17,815		13,400		31,215	
2. Covered Payroll						
a. As of the Valuation Date	\$ 1,609,894,477		\$786,538,311		\$ 2,396,432,788	
b. Projected Capped Payroll for Fiscal Year 2022	1,609,894,477		787,858,327		2,397,752,804	
c. Projected Capped Payroll for Fiscal Year 2023	1,570,932,797		886,977,432		2,457,910,229	
3. Actuarial Accrued Liability						
a. Retirement Benefits	\$ 5,831,667,074		\$ 136,466,410		\$ 5,968,133,484	
b. Withdrawal	686,680,123		144,747,716		831,427,839	
c. Death Benefits	73,925,704		7,300,234		81,225,938	
d. Disability	96,028,971		13,313,822		109,342,793	
e. Total	\$ 6,688,301,872		\$ 301,828,182		\$ 6,990,130,054	
4. Normal Cost	Amount	% of Payroll	Amount	% of Payroll	Amount	% of Payroll
a. Retirement Benefits	\$ 295,331,831	18.34%	\$ 25,877,314	3.28%	\$ 321,209,145	13.40%
b. Withdrawal	50,245,923	3.12%	33,697,950	4.28%	83,943,873	3.50%
c. Death Benefits	4,208,895	0.26%	1,434,874	0.18%	5,643,769	0.24%
d. Disability	5,680,347	0.35%	2,433,914	0.31%	8,114,261	0.34%
e. Administrative Expenses	15,635,634	0.97%	7,651,846	0.97%	23,287,480	0.97%
f. Total	\$ 371,102,630	23.05%	\$ 71,095,898	9.02%	\$ 442,198,528	18.44%
5. Expected Employee Contributions	\$ 144,890,503	9.00%	\$ 70,907,249	9.00%	\$ 215,797,752	9.00%
6. Annual Employer Normal Cost	\$ 226,212,127	14.05%	\$ 188,649	0.02%	\$ 226,400,776	9.44%

^aThe actuarial accrued liability, normal cost, projected capped payroll and expected employee contributions include the results for 26 members expected to be hired to replace retirements and terminations that occurred in June 2021. Active count excludes 26 members expected to be hired to replace retirements and terminations that occurred in June 2021.

Actuarial Accrued Liability and Normal Cost are determined under the Projected Unit Credit actuarial cost method.

Normal Cost rates as a percent of pay under the Projected Unit Credit actuarial cost method increase over a member's career.



Table 3

Analysis of Change in Unfunded Actuarial Accrued Liability

In addition to the expected change in the unfunded accrued actuarial liability, changes in membership demographics and fund assets have affected the actuarial valuation results. The increase in the unfunded actuarial accrued liability (UAAL) of \$359,178,897 was due to the following:

1. Unfunded Actuarial Accrued Liability (UAAL) at 06/30/2020	\$ 12,833,274,562
2. Contributions	
a. Contributions due (Normal Cost plus interest on the UAAL)	
i interest on item 1.	\$ 866,246,033
ii members contributions	215,092,566
iii employer normal cost (middle of year)	249,636,998
iv interest on ii and iii	15,428,518
v total due	\$ 1,346,404,115
b. Contributions paid (Actual)	
i member contributions	\$ 215,092,566
ii employer	885,894,000
iii interest on i and ii ^a	21,399,923
iv total paid	\$ 1,122,386,489
c. Expected increase in Unfunded Actuarial Accrued Liability	\$ 224,017,626
3. Expected Unfunded Actuarial Accrued Liability at 06/30/2021	\$ 13,057,292,188
4. (Gains)/Losses	
a. investment income	\$ (460,056,077)
b. retiree health insurance cash flows	(14,758,285)
c. salary increases	(46,401,560)
d. demographic	(71,330,249)
e. total	\$ (592,546,171)
5. Plan Provision Changes	\$ -
6. Assumption Changes	\$ 727,707,442
7. Total Change in UAAL	\$ 359,178,897
8. UAAL at 06/30/2021	\$ 13,192,453,459

^aInterest on employer contributions is estimated based on a weighted timing of middle of year, 8/12^{ths} of a year, and end of year.



Table 4

Analysis of Financial (Gains) and Losses in Unfunded Actuarial Accrued Liability for Fiscal Year Ending June 30, 2021

Activity	(Gain)/Loss	% of 06/30/2020 AAL
1. Actuarial (Gain)/Loss		
a. Retirements	\$ (4,923,996)	-0.02%
b. Incidence of Disability	(1,469,401)	-0.01%
c. In-Service Mortality	981,677	0.00%
d. Retiree and Deferred Experience	(97,252,780)	-0.40%
e. Salary Increases	(46,401,560)	-0.19%
f. Terminations	(15,640,541)	-0.06%
g. Investment Return	(460,056,077)	-1.91%
h. Retiree Health Insurance Cash Flows	(14,758,285)	-0.06%
i. New Entrant Liability	39,611,532	0.16%
j. Other	7,363,260	0.03%
k. Total Actuarial (Gain)/Loss	\$ (592,546,171)	-2.46%
2. Plan Provision Changes	\$ -	0.00%
3. Assumption Changes	\$ 727,707,442	3.02%
4. Contribution (Excess)/Shortfall ^a	\$ 224,017,626	0.93%
5. Total Financial (Gain)/Loss (1.k.+2.+3.+4.)	\$ 359,178,897	1.49%

^a Represents the increase in the Unfunded Actuarial Accrued Liability due to actual contributions being less than the Normal Cost plus interest on the beginning of year Unfunded Actuarial Accrued Liability.

Graph 1

Financial (Gains) and Losses in Unfunded Actuarial Accrued Liability for Fiscal Year Ending June 30, 2021, by Source

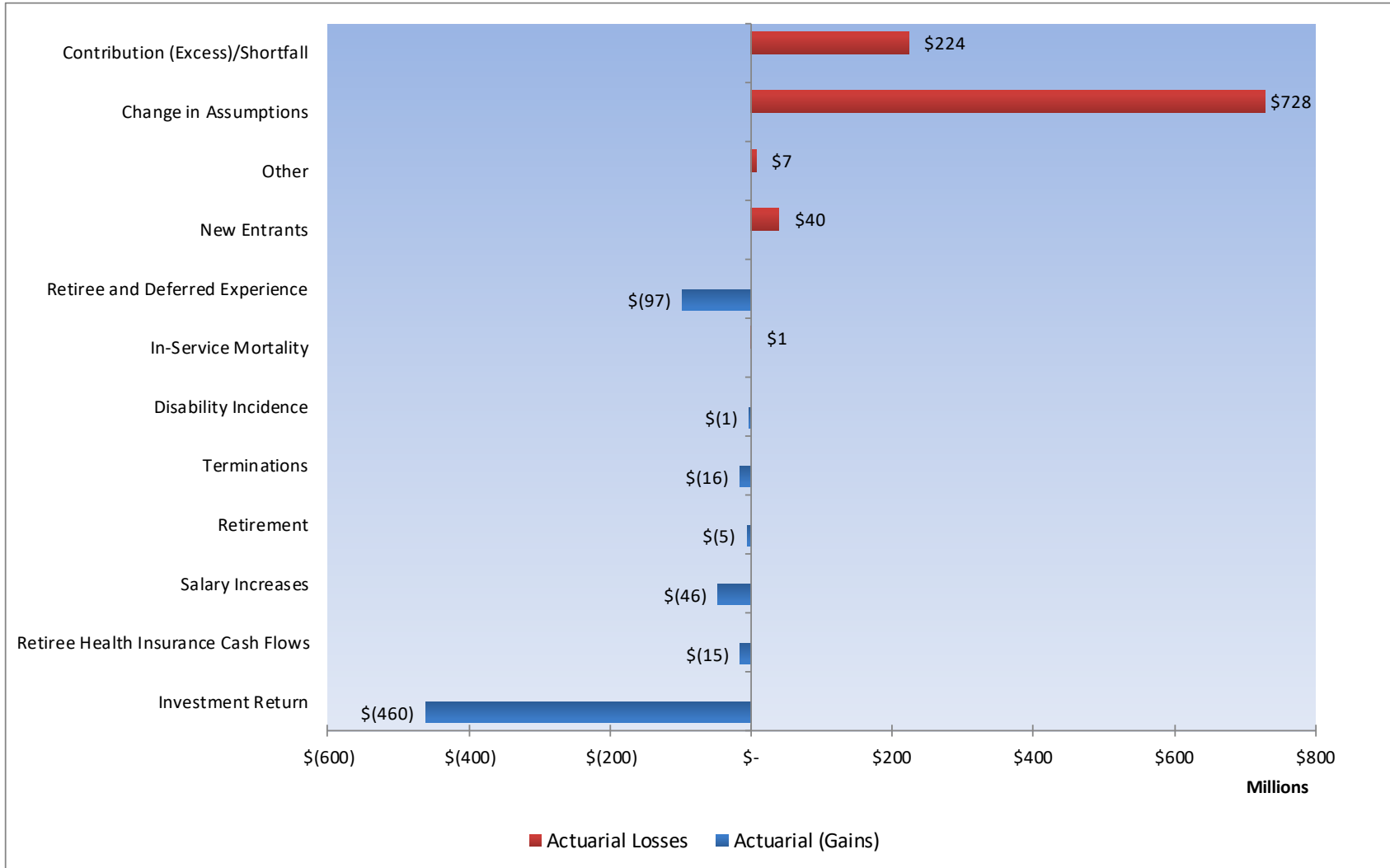


Table 5a

Historical Financial (Gains) and Losses in Unfunded Actuarial Accrued Liability

	Amount of (Gain) or Loss					Total Five-year Change
	FY 2017	FY 2018	FY 2019	FY 2020	FY 2021	
Investment Return (AVA Basis)	\$ (80,937,857)	\$ 131,839,730	\$ 98,317,079	\$ (22,146,029)	\$ (460,056,077)	\$ (332,983,154)
Retiree Health Insurance Cash Flows	(17,178,251)	1,381,154	(6,608,283)	(14,032,804)	(14,758,285)	(51,196,469)
Salary Increases	(180,217,505)	6,927,266	(62,859,630)	(118,074,777)	(46,401,560)	(400,626,206)
Retirements	32,846,858	27,778,569	1,996,977	6,878,558	(4,923,996)	64,576,966
Terminations	(7,478,652)	(39,625,292)	(46,251,276)	(19,358,722)	(15,640,541)	(128,354,483)
Disability Incidence	(685,126)	(1,010,548)	(966,542)	(1,131,160)	(1,469,401)	(5,262,777)
In-Service Mortality	657,829	1,253,670	123,792	(70,494)	981,677	2,946,474
Retiree and Deferred Experience	14,544,206	70,809,472	5,854,235	(55,588,659)	(97,252,780)	(61,633,526)
New Entrants	32,961,135	38,467,726	44,926,283	45,481,403	39,611,532	201,448,079
Other ^a	(54,889,992)	(28,017,087)	(22,939,305)	(31,564,992)	7,363,260	(130,048,116)
Total Actuarial (Gain)/Loss	\$ (260,377,355)	\$ 209,804,660	\$ 11,593,330	\$ (209,607,676)	\$ (592,546,171)	\$ (841,133,212)
(Gain)/Loss as a % of BOY AAL	(1.3)%	1.0%	0.1%	(0.9)%	(2.5)%	
Total Non-Investment (Gain)/Loss	\$ (179,439,498)	\$ 77,964,930	\$ (86,723,749)	\$ (187,461,647)	\$ (132,490,094)	\$ (508,150,058)
(Gain)/Loss as a % of BOY AAL	(0.9)%	0.4%	(0.4)%	(0.8)%	(0.6)%	
(Gain)/Loss Due to Plan Provisions Changes	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
(Gain)/Loss as a % of BOY AAL	-	-	-	-	-	
(Gain)/Loss Due to Assumption Changes	\$ 1,074,523,844	\$ 621,772,494	\$ -	\$ 565,206,537	\$ 727,707,442	\$ 2,989,210,317
(Gain)/Loss as a % of BOY AAL	5.2%	2.8%	0.0%	2.4%	3.0%	
(Gain)/Loss Due to Contribution (Excess)/Shortfall	\$ 220,857,399	\$ 233,351,269	\$ 264,851,308	\$ 247,324,028	\$ 224,017,626	\$ 1,190,401,630
(Gain)/Loss as a % of BOY AAL	1.1%	1.1%	1.2%	1.1%	0.9%	
Total Financial (Gain)/Loss	\$ 1,035,003,888	\$ 1,064,928,423	\$ 276,444,638	\$ 602,922,889	\$ 359,178,897	\$ 3,338,478,735
(Gain)/Loss as a % of BOY AAL	5.1%	4.9%	1.2%	2.6%	1.5%	
BOY Actuarial Accrued Liability (AAL)	\$ 20,484,951,277	\$ 21,822,010,297	\$ 22,922,992,558	\$ 23,252,163,307	\$ 24,073,482,607	

^a Includes other experience such as deviations between actual and expected benefit payments and unexpected changes in service.



Table 5b
Historical Normal Cost Amounts (\$ and % of Pay)

Actuarial Valuation Date: Required Employer Contributions for Fiscal Year Ending:	June 30, 2020 June 30, 2021		June 30, 2021 June 30, 2022		Projected from June 30, 2021 June 30, 2023	
1. Projected Capped Payroll for the Fiscal Year	\$ 2,267,288,286		\$ 2,397,752,804		\$ 2,457,910,229	
2. Normal Cost	Amount	% of Payroll	Amount	% of Payroll	Amount	% of Payroll
a. Retirement Benefits	\$ 288,007,934	12.70%	\$ 321,209,145	13.40%	\$ 329,491,519	13.41%
b. Withdrawal	75,911,356	3.35%	83,943,873	3.50%	83,483,382	3.40%
c. Death Benefits	5,149,501	0.23%	5,643,769	0.24%	5,669,466	0.23%
d. Disability	7,340,931	0.32%	8,114,261	0.34%	8,243,133	0.34%
e. Administrative Expenses	23,319,842	1.03%	23,287,480	0.97%	24,626,000	1.00%
f. Total	\$ 399,729,564	17.63%	\$ 442,198,528	18.44%	\$ 451,513,500	18.37%
3. Expected Employee Contributions	\$ 204,055,946 9.00%		\$ 215,797,752 9.00%		\$ 221,211,921 9.00%	
4. Annual Employer Normal Cost	\$ 195,673,618 8.63%		\$ 226,400,776 9.44%		\$ 230,301,580 9.37%	

SECTION D

ACTUARIAL PROJECTIONS

Table 6

**Baseline Projections — Employer Contributions Determined under Public Act 90-0655,
Public Act 91-0357, Public Act 96-0889 and Public Act 100-0465
Investment Return of 6.50% Each Year (\$ in Millions)**

Fiscal Year	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Liability	Funded Ratio	Pensionable Payroll	Annual Normal Cost				Total Employer Contributions					Total Expenses	
						Total	Employer			Required Employer Contribution	Additional State Contributions	State Normal Cost	Additional Board of Education Contributions	Required Board of Education Contributions		Percent of Pay
							Employee Contribution	Normal Cost	Percent of Pay							
2022	\$25,550.7	\$12,600.4	\$12,950.3	49.32%	\$2,397.8	\$507.2	\$215.8	\$291.4	12.15%	\$944.7	\$12.6	\$264.8	\$13.5	\$653.7	39.40%	\$1,670.0
2023	25,989.4	13,287.0	12,702.4	51.12%	2,457.9	516.5	221.2	295.3	12.01%	860.3	13.4	295.3	14.3	537.4	35.00%	1,700.7
2024	26,434.7	14,098.0	12,336.7	53.33%	2,514.5	525.4	226.3	299.1	11.90%	880.1	13.7	299.1	14.6	552.8	35.00%	1,730.9
2025	26,885.3	14,404.3	12,481.0	53.58%	2,570.6	533.4	231.4	302.1	11.75%	899.8	14.0	302.1	14.9	568.8	35.00%	1,761.7
2026	27,339.4	14,699.0	12,640.4	53.76%	2,625.7	540.7	236.3	304.4	11.59%	919.1	14.3	304.4	15.2	585.2	35.00%	1,794.1
2027	27,797.5	14,987.4	12,810.1	53.92%	2,681.1	547.6	241.3	306.2	11.42%	938.5	14.6	306.2	15.6	602.1	35.00%	1,825.7
2028	28,258.3	15,275.2	12,983.1	54.06%	2,736.2	553.7	246.3	307.4	11.23%	957.7	14.9	307.4	15.9	619.6	35.00%	1,858.0
2029	28,720.4	15,570.5	13,149.9	54.21%	2,790.9	559.0	251.2	307.9	11.03%	976.9	15.2	307.9	16.2	637.6	35.00%	1,891.1
2030	29,182.5	15,873.9	13,308.6	54.40%	2,845.8	563.8	256.1	307.7	10.81%	996.1	15.5	307.7	16.5	656.4	35.00%	1,925.0
2031	29,641.9	16,184.4	13,457.5	54.60%	2,901.4	568.2	261.1	307.0	10.58%	1,015.6	15.8	307.0	16.8	675.9	35.00%	1,961.1
2032	30,117.6	16,522.7	13,594.9	54.86%	2,958.2	572.1	266.2	305.8	10.34%	1,035.4	16.1	305.8	17.2	696.4	35.00%	1,978.0
2033	30,590.4	16,871.0	13,719.4	55.15%	3,014.8	575.3	271.3	304.0	10.08%	1,055.3	16.4	304.0	17.5	717.4	35.00%	2,014.2
2034	31,058.7	17,229.7	13,829.0	55.47%	3,072.2	578.0	276.5	301.5	9.81%	1,075.3	16.7	301.5	17.8	739.3	35.00%	2,050.9
2035	31,521.1	17,598.7	13,922.4	55.83%	3,129.7	580.0	281.7	298.3	9.53%	1,095.5	17.0	298.3	18.2	761.9	35.00%	2,088.2
2036	31,976.2	17,978.7	13,997.5	56.23%	3,187.9	581.5	286.9	294.6	9.24%	1,115.8	17.3	294.6	18.5	785.4	35.00%	2,125.9
2037	32,422.6	18,372.2	14,050.4	56.66%	3,246.3	580.5	292.2	288.3	8.88%	1,136.3	17.7	288.3	18.8	811.5	35.00%	2,161.9
2038	32,859.0	18,779.9	14,079.1	57.15%	3,305.3	578.9	297.5	281.4	8.51%	1,156.9	18.0	281.4	19.2	838.4	35.00%	2,198.2
2039	33,283.3	19,202.2	14,081.1	57.69%	3,364.5	576.9	302.8	274.1	8.15%	1,177.6	18.3	274.1	19.5	865.8	35.00%	2,235.3
2040	33,693.6	19,639.3	14,054.3	58.29%	3,424.9	574.6	308.2	266.4	7.78%	1,198.8	18.6	266.4	19.9	893.9	35.00%	2,273.4
2041	34,088.0	20,092.6	13,995.4	58.94%	3,487.2	572.0	313.8	258.1	7.40%	1,220.6	19.0	258.1	20.2	923.3	35.00%	2,312.1

Normal cost includes administrative expenses and health insurance subsidy. The health insurance subsidy is assumed to be \$65 million each year.

Total expenses shown include benefit payments, refunds, administrative expenses and health insurance subsidy.

Actuarial accrued liability and assets are measured at the end of the fiscal year. Normal Cost is measured at the middle of the fiscal year.

State contributions, benefit payments, refunds, administrative expenses and employee contributions are assumed to occur during the middle of the year.

55 percent of the Board of Education's dedicated property tax levy of 0.567 percent is assumed to be paid March 1, each fiscal year. The remaining Board of Education contributions are assumed to occur at the end of the year.

Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



Table 6 (Continued)

Baseline Projections — Employer Contributions Determined under Public Act 90-0655, Public Act 91-0357, Public Act 96-0889 and Public Act 100-0465 Investment Return of 6.50% Each Year (\$ in Millions)

Fiscal Year	Actuarial Accrued Liability	Actuarial Value of Assets	Unfunded Liability	Funded Ratio	Pensionable Payroll	Annual Normal Cost				Total Employer Contributions					Total Expenses	
						Total	Employer			Required Employer Contribution	Additional State Contributions	State Normal Cost	Additional Board of Education Contributions	Required Board of Education Contributions		Percent of Pay
							Employee Contribution	Normal Cost	Percent of Pay							
2042	\$34,464.0	\$20,562.4	\$13,901.6	59.66%	\$3,550.4	\$569.1	\$319.5	\$249.6	7.03%	\$1,242.7	\$19.3	\$249.6	\$20.6	\$953.2	35.00%	\$2,351.7
2043	34,822.2	21,051.9	13,770.3	60.46%	3,616.5	567.0	325.5	241.5	6.68%	1,265.9	19.7	241.5	21.0	983.7	35.00%	2,390.7
2044	35,162.8	21,564.8	13,598.0	61.33%	3,686.3	565.7	331.8	234.0	6.35%	1,290.3	20.1	234.0	21.4	1,014.9	35.00%	2,428.9
2045	35,488.2	22,105.9	13,382.3	62.29%	3,759.7	565.9	338.4	227.6	6.05%	1,316.0	20.5	227.6	21.8	1,046.2	35.00%	2,465.4
2046	35,801.8	22,682.0	13,119.8	63.35%	3,837.8	568.0	345.4	222.6	5.80%	1,343.3	20.9	222.6	22.3	1,077.6	35.00%	2,499.3
2047	36,106.0	23,298.1	12,807.9	64.53%	3,919.4	571.9	352.7	219.1	5.59%	1,371.9	21.3	219.1	22.7	1,108.7	35.00%	2,532.1
2048	36,406.0	23,962.1	12,443.9	65.82%	4,004.4	577.7	360.4	217.3	5.43%	1,401.6	21.8	217.3	23.2	1,139.3	35.00%	2,561.1
2049	36,705.5	24,680.9	12,024.6	67.24%	4,092.3	585.2	368.3	216.9	5.30%	1,432.4	22.3	216.9	23.7	1,169.5	35.00%	2,588.0
2050	37,005.9	25,459.1	11,546.8	68.80%	4,181.8	593.5	376.4	217.2	5.19%	1,463.7	22.7	217.2	24.3	1,199.6	35.00%	2,614.4
2051	37,307.1	26,300.1	11,007.0	70.50%	4,271.0	602.4	384.4	218.0	5.10%	1,495.0	23.2	218.0	24.8	1,228.9	35.00%	2,641.3
2052	37,608.4	27,206.6	10,401.8	72.34%	4,360.3	611.8	392.4	219.4	5.03%	1,526.2	23.7	219.4	25.3	1,257.8	35.00%	2,669.6
2053	37,908.8	28,181.3	9,727.5	74.34%	4,449.8	621.7	400.5	221.2	4.97%	1,557.5	24.2	221.2	25.8	1,286.3	35.00%	2,699.4
2054	38,206.7	29,227.2	8,979.5	76.50%	4,540.7	632.3	408.7	223.6	4.92%	1,589.3	24.7	223.6	26.3	1,314.7	35.00%	2,731.3
2055	38,498.4	30,345.4	8,153.0	78.82%	4,632.9	643.5	417.0	226.5	4.89%	1,621.6	25.2	226.5	26.9	1,343.1	35.00%	2,767.2
2056	38,780.7	31,537.7	7,243.0	81.32%	4,726.3	655.2	425.4	229.9	4.86%	1,654.3	25.7	229.9	27.4	1,371.3	35.00%	2,806.5
2057	39,052.3	32,808.3	6,244.0	84.01%	4,821.1	667.5	433.9	233.6	4.85%	1,687.5	26.2	233.6	28.0	1,399.7	35.00%	2,847.0
2058	39,314.1	34,163.8	5,150.3	86.90%	4,916.7	680.3	442.5	237.8	4.84%	1,721.0	26.7	237.8	28.5	1,428.0	35.00%	2,886.3
2059	39,568.4	35,612.8	3,955.6	90.00%	5,013.2	693.4	451.2	242.2	4.83%	1,754.7	27.3	242.2	29.1	1,456.2	35.00%	2,923.1

Normal cost includes administrative expenses and health insurance subsidy. The health insurance subsidy is assumed to be \$65 million each year.

Total expenses shown include benefit payments, refunds, administrative expenses and health insurance subsidy.

Actuarial accrued liability and assets are measured at the end of the fiscal year. Normal Cost is measured at the middle of the fiscal year.

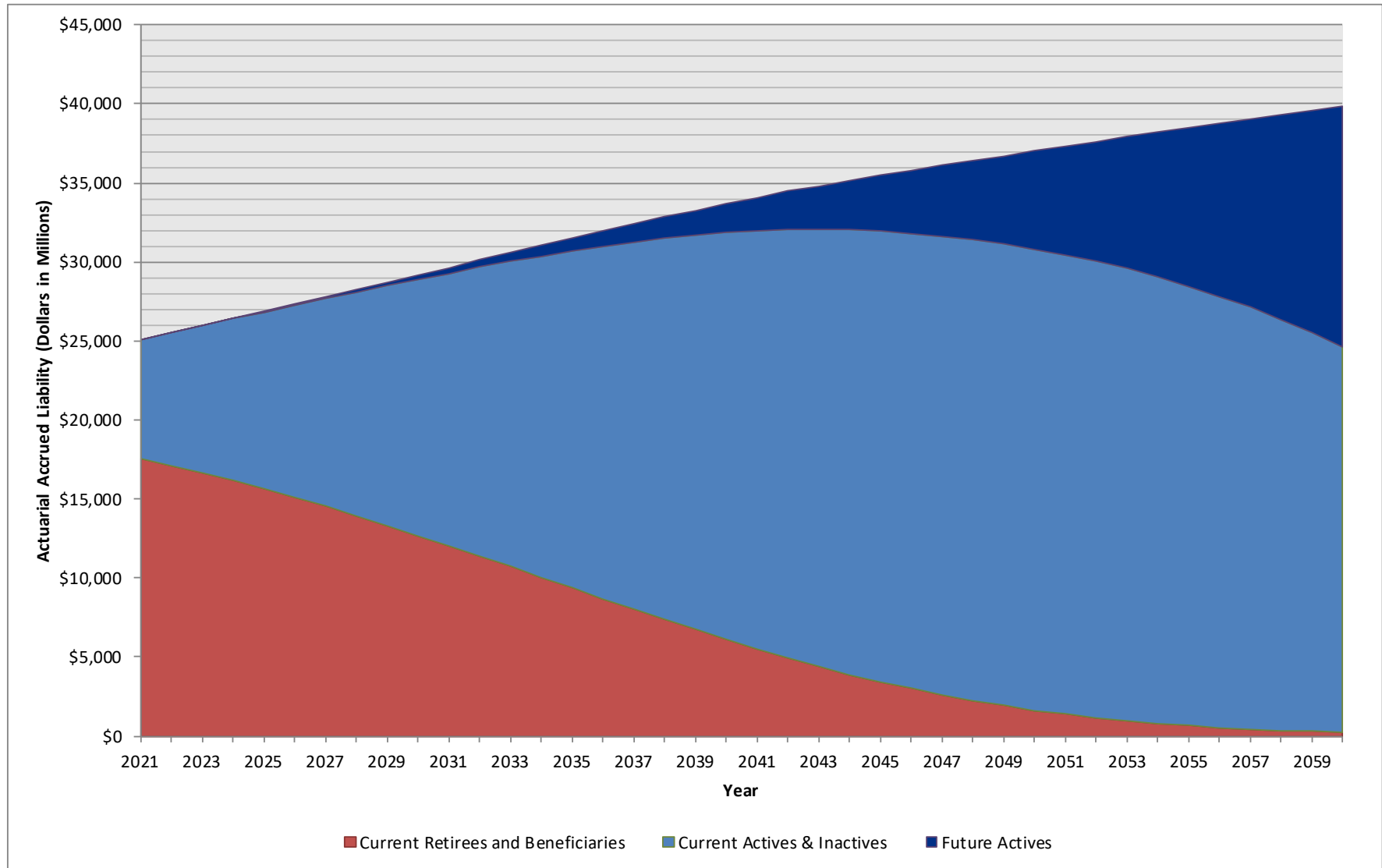
State contributions, benefit payments, refunds, administrative expenses and employee contributions are assumed to occur during the middle of the year.

55 percent of the Board of Education's dedicated property tax levy of 0.567 percent is assumed to be paid March 1, each fiscal year. The remaining Board of Education contributions are assumed to occur at the end of the year.

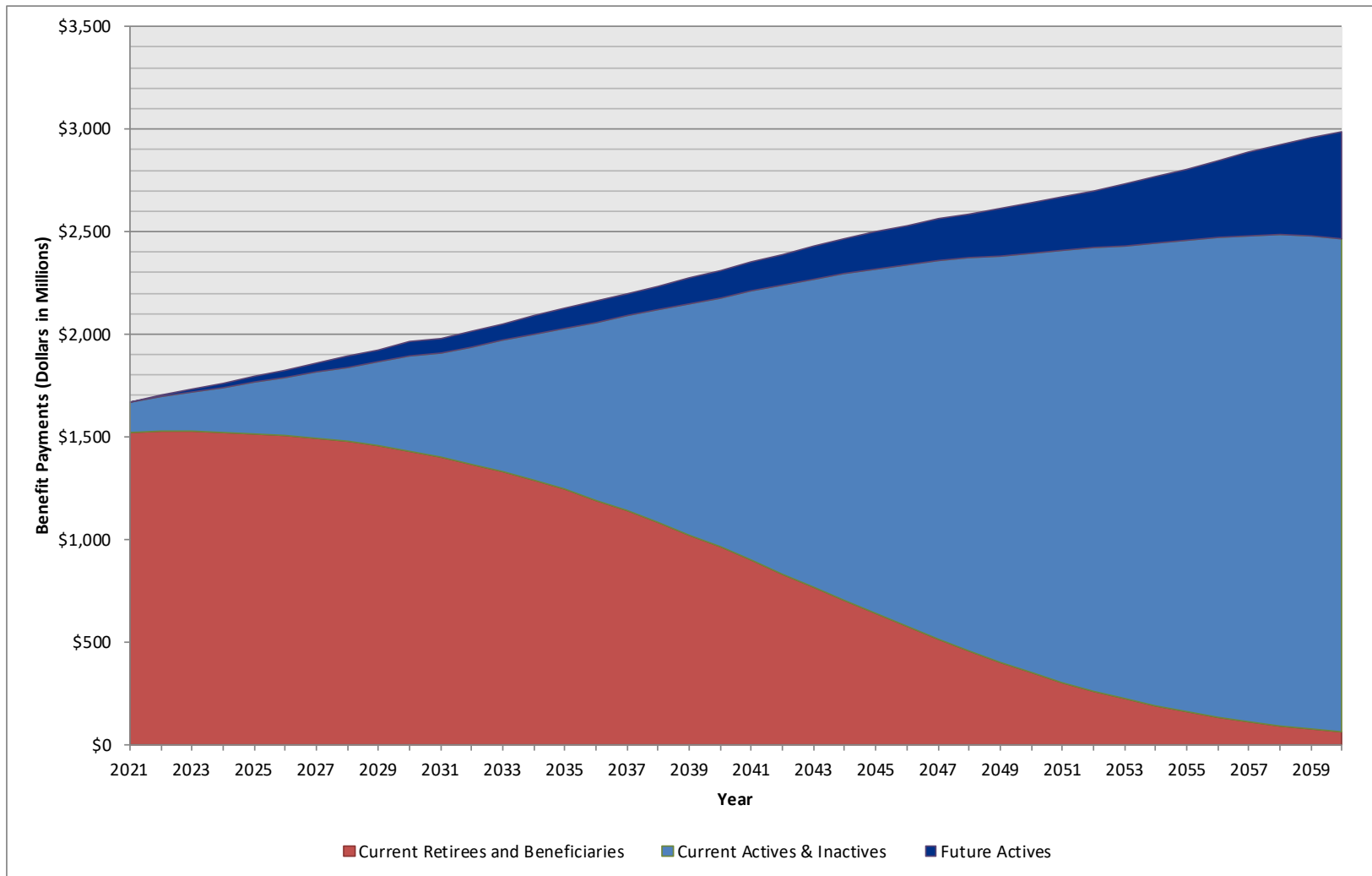
Total payroll is capped for members hired after December 31, 2010, as defined in Public Act 96-0889.



Graph 2 Projected Actuarial Accrued Liabilities Actuarial Valuation as of June 30, 2021

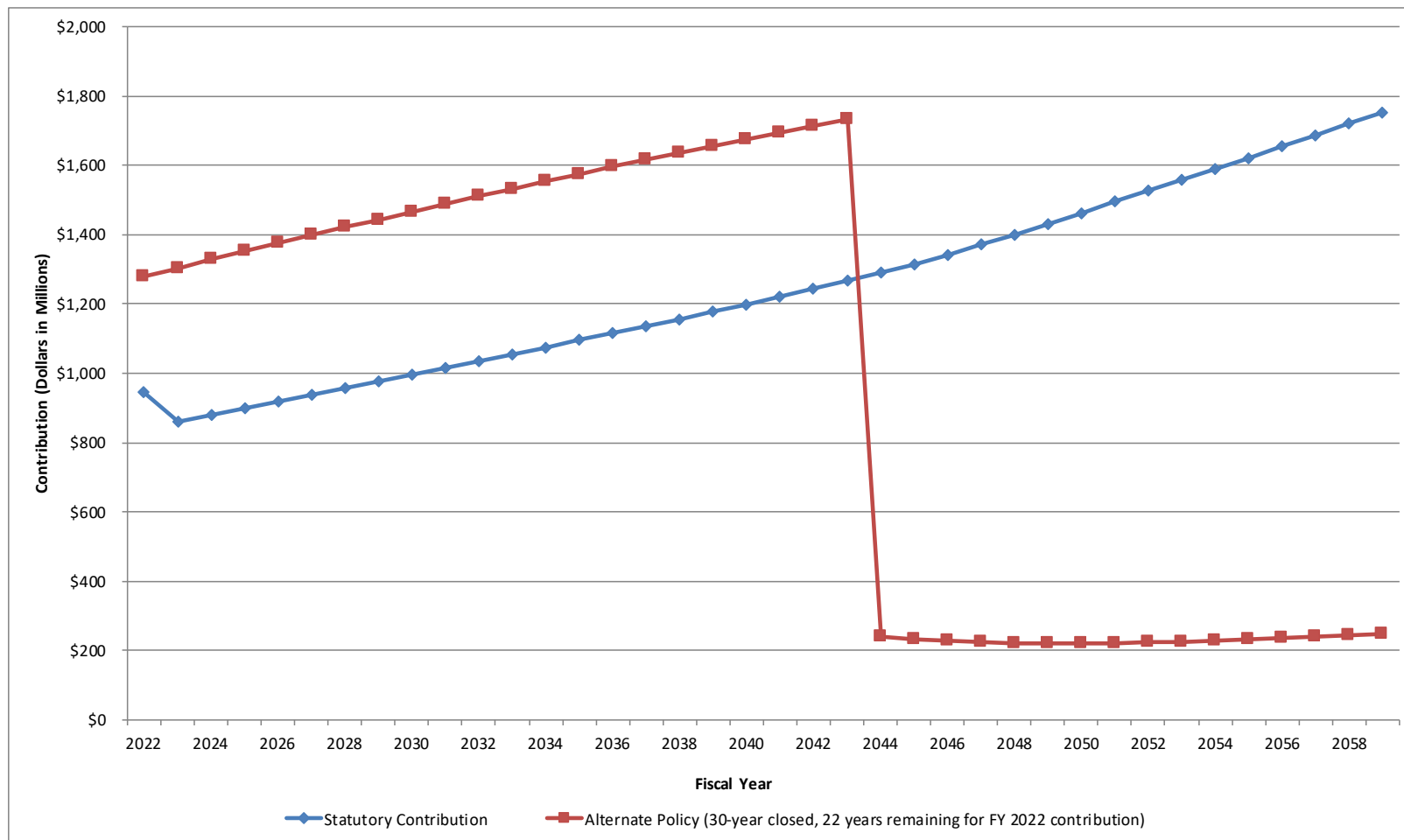


Graph 3 Projected Benefit Payments (Including Administrative Expenses and Health Insurance Subsidy) Actuarial Valuation as of June 30, 2021



Graph 4

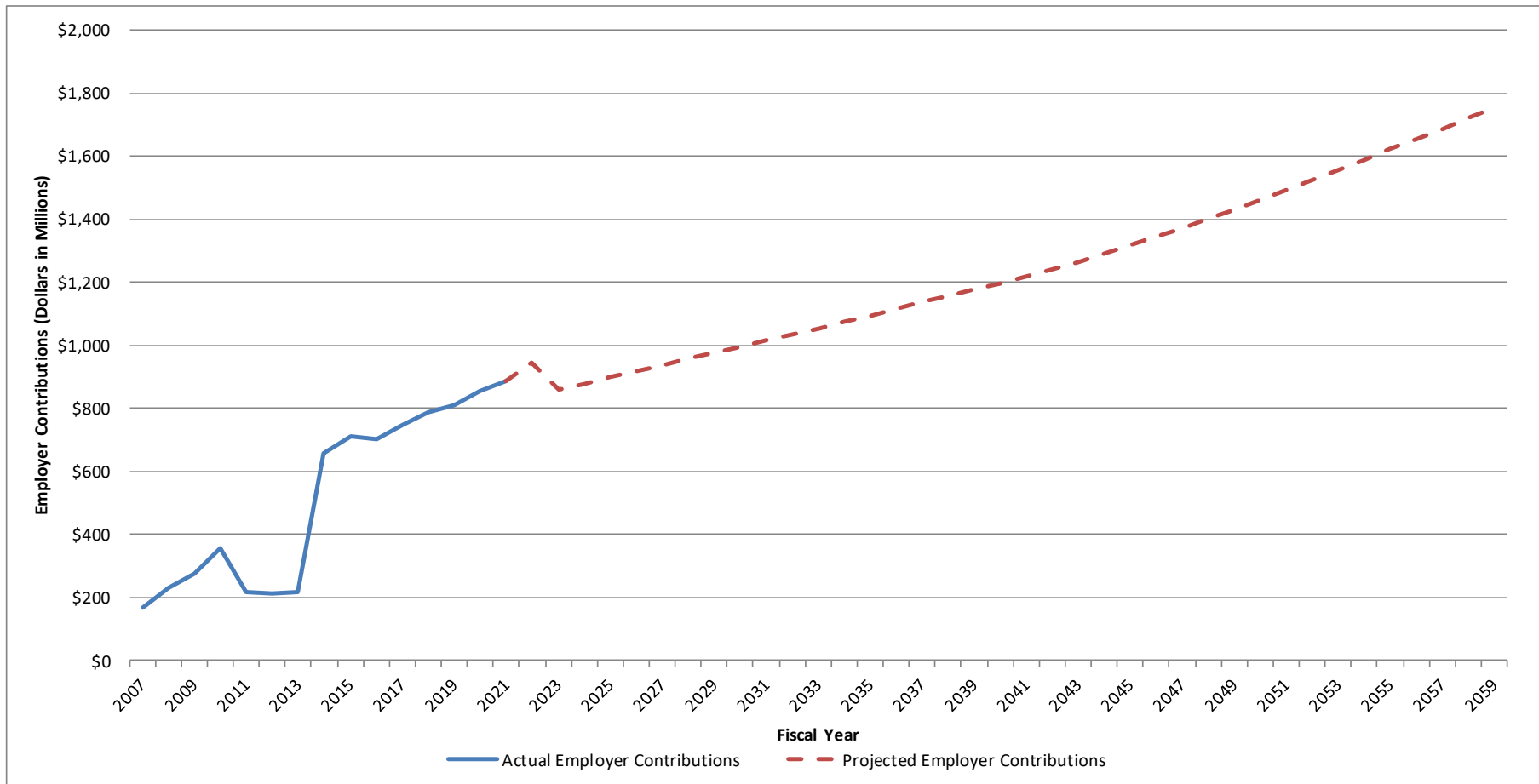
Projected Statutory Contributions vs. Contributions under Alternate Policy (Normal Cost Plus 30-Year Closed Period Level Percent of Pay Amortization) (22 Years Remaining in Amortization Period for FY 2022 Contribution)



Alternate funding policy of normal cost plus 30-year closed period amortization of the unfunded liability as a level percentage of capped payroll beginning in FY 2014 and 22 years remaining in FY 2022.



Graph 5 Actual and Projected Employer Contributions



SECTION E

FUND ASSETS

Table 7

Statement of Fiduciary Net Position for Years Ended June 30, 2021 and 2020

	June 30, 2021			June 30, 2020		
	Pension Fund	Health Insurance Fund	Total Fund - Pension and Health Insurance	Pension Fund	Health Insurance Fund	Total Fund - Pension and Health Insurance
Assets:						
Cash	\$ 4,198,799	\$ -	\$ 4,198,799	\$ 60,193,099	\$ -	\$ 60,193,099
Prepaid expense	753,553	-	753,553	612,250	-	612,250
Receivables:						
Minimum funding requirement (Employer)	235,258,853	-	235,258,853	232,392,721	-	232,392,721
Minimum funding requirement (State)	-	-	-	-	-	-
Employee	14,636,271	-	14,636,271	10,783,758	-	10,783,758
Accrued investment income	38,749,855	-	38,749,855	36,255,805	-	36,255,805
Due from brokers	49,271,609	-	49,271,609	81,201,107	-	81,201,107
Participating teachers' accounts for contributions	4,874,359	-	4,874,359	4,535,674	-	4,535,674
Other receivables	19,208,975	5,133,792	24,342,767	10,590,492	8,720,656	19,311,148
Total receivables	361,999,922	5,133,792	367,133,714	375,759,557	8,720,656	384,480,213
Investments, at fair value:						
U.S. government and agency fixed income	1,387,460,313	-	1,387,460,313	1,307,282,631	-	1,307,282,631
U.S. corporate fixed income	1,159,974,052	-	1,159,974,052	1,227,940,708	-	1,227,940,708
Foreign fixed income securities	58,051,391	-	58,051,391	49,326,494	-	49,326,494
U.S. equities	3,970,897,513	-	3,970,897,513	2,959,380,844	-	2,959,380,844
Foreign equities	3,980,404,709	-	3,980,404,709	3,033,910,935	-	3,033,910,935
Public REITs	153,842,910	-	153,842,910	115,436,398	-	115,436,398
Pooled short-term investment funds	477,384,615	-	477,384,615	479,732,946	-	479,732,946
Real estate	1,124,107,108	-	1,124,107,108	922,797,885	-	922,797,885
Infrastructure	207,366,935	-	207,366,935	203,049,254	-	203,049,254
Private equity	728,131,796	-	728,131,796	432,031,348	-	432,031,348
Total investments	13,247,621,342	-	13,247,621,342	10,730,889,443	-	10,730,889,443
Securities lending collateral	886,541,946	-	886,541,946	686,855,566	-	686,855,566
Capital assets, net of accumulated depreciation	1,335,968	-	1,335,968	1,922,247	-	1,922,247
Total assets	14,502,451,530	5,133,792	14,507,585,322	11,856,232,162	8,720,656	11,864,952,818
Liabilities:						
Benefits payable	4,615,207	5,065,986	9,681,193	5,164,409	8,696,400	13,860,809
Refunds payable	17,135,750	-	17,135,750	13,681,903	-	13,681,903
Accounts and administrative expenses payable	14,387,444	67,806	14,455,250	9,287,445	24,256	9,311,701
Securities lending collateral payable	896,023,737	-	896,023,737	686,655,357	-	686,655,357
Due to brokers	197,247,800	-	197,247,800	204,381,027	-	204,381,027
Total liabilities	1,129,409,938	5,133,792	1,134,543,730	919,170,141	8,720,656	927,890,797
Net Position Restricted for Pension Benefits	<u>\$ 13,373,041,592</u>	<u>\$ -</u>	<u>\$ 13,373,041,592</u>	<u>\$ 10,937,062,021</u>	<u>\$ -</u>	<u>\$ 10,937,062,021</u>



Table 8

Statement of Changes in Fiduciary Net Position for Years Ended June 30, 2021 and 2020

	June 30, 2021			June 30, 2020		
	Pension Fund	Health Insurance Fund	Total Fund - Pension and Health Insurance	Pension Fund	Health Insurance Fund	Total Fund - Pension and Health Insurance
Additions:						
Contributions:						
Employee	\$ 215,092,566	\$ -	\$ 215,092,566	\$ 196,097,115	\$ -	\$ 196,097,115
Minimum funding requirement (Employer)	619,001,000	-	619,001,000	597,151,000	-	597,151,000
Minimum funding requirement (State)	266,893,000	-	266,893,000	257,349,000	-	257,349,000
Allocation to health insurance fund	(51,350,898)	51,350,898	-	(51,962,540)	51,962,540	-
Total contributions	1,049,635,668	51,350,898	1,100,986,566	998,634,575	51,962,540	1,050,597,115
Investment income:						
Net appreciation (depreciation) in fair value	2,719,441,850	-	2,719,441,850	98,040,345	-	98,040,345
Interest	78,672,576	-	78,672,576	160,841,176	-	160,841,176
Dividends	184,612,984	-	184,612,984	221,153,927	-	221,153,927
Miscellaneous	985,739	-	985,739	1,245,405	-	1,245,405
Securities lending income, net	3,398,048	-	3,398,048	3,675,381	-	3,675,381
Less investment expense:						
Investment advisory and custodial fees	(51,320,396)	-	(51,320,396)	(46,143,884)	-	(46,143,884)
Net investment income	2,935,790,801	-	2,935,790,801	438,812,350	-	438,812,350
Interest on late required contribution payments	1,761,509	-	1,761,509	1,166,174	-	1,166,174
Miscellaneous	64,687	-	64,687	334,222	-	334,222
Total additions	3,987,252,665	51,350,898	4,038,603,563	1,438,947,321	51,962,540	1,490,909,861
Deductions:						
Pension benefits	1,512,582,986	-	1,512,582,986	1,499,920,081	-	1,499,920,081
Refunds	18,056,876	-	18,056,876	19,522,894	-	19,522,894
2.2 Legislative refunds	168,585	-	168,585	673,391	-	673,391
Refund of insurance premiums	-	50,715,931	50,715,931	-	51,433,976	51,433,976
Death benefits	3,442,403	-	3,442,403	2,759,158	-	2,759,158
Total benefits payments	1,534,250,850	50,715,931	1,584,966,781	1,522,875,524	51,433,976	1,574,309,500
Administrative and miscellaneous expenses	17,022,244	634,967	17,657,211	17,847,235	528,564	18,375,799
Total deductions	1,551,273,094	51,350,898	1,602,623,992	1,540,722,759	51,962,540	1,592,685,299
Net increase	2,435,979,571	-	2,435,979,571	(101,775,438)	-	(101,775,438)
Net Position Restricted for Pension Benefits						
Beginning of the Year	10,937,062,021	-	10,937,062,021	11,038,837,459	-	11,038,837,459
End of year	\$ 13,373,041,592	\$ -	\$ 13,373,041,592	\$ 10,937,062,021	\$ -	\$ 10,937,062,021



Table 9

Development of the Actuarial Value of Assets

Year Ending June 30	2021	2022	2023	2024
Beginning of Year:				
(1) Market Value of Assets	\$ 10,937,062,021			
(2) Actuarial Value of Assets	11,240,208,045			
End of Year:				
(3) Market Value of Assets	13,373,041,592			
(4) Contributions and Disbursements				
(4a) Actual Employer & Misc. Contributions	887,720,196			
(4b) Employee Contributions	215,092,566			
(4c) Benefit Payouts & Refunds	(1,584,966,781)			
(4d) Administrative Expenses	(17,657,211)			
(4e) Net of Contributions and Disbursements	(499,811,230)			
(5) Total Investment Income				
=(3)-(1)-(4e)	2,935,790,801			
(6) Projected Rate of Return	6.75%			
(7) Projected Investment Income ^a	726,908,587			
(8) Investment Income in Excess of Projected Income	2,208,882,214			
(9) Excess Investment Income Recognized This Year (4-year recognition)				
(9a) From This Year	\$ 552,220,554			
(9b) From One Year Ago	(74,881,554)	\$ 552,220,554		
(9c) From Two Years Ago	(54,664,804)	(74,881,554)	\$ 552,220,554	
(9d) From Three Years Ago	35,555,685	(54,664,803)	(74,881,554)	\$ 552,220,552
(9e) Total Recognized Investment Gain	458,229,881	422,674,197	477,339,000	552,220,552
(10) Change in Actuarial Value of Assets				
=(4e)+(7)+(9e)	\$ 685,327,238			
End of Year:				
(3) Market Value of Assets	\$ 13,373,041,592			
(11) Actuarial Value of Assets	\$ 11,925,535,283			
= (2)+(10)				
(12) Difference between Market & Actuarial Values	\$ 1,447,506,309			
(13) Estimated Actuarial Value Rate of Return	10.78%			
(14) Estimated Market Value Rate of Return	27.47%			
(15) Ratio of Actuarial Value to Market Value	89.18%			

^aProjected investment income is estimated based on the actuarial value of assets and weighted timing of middle of year, 8/12^{ths} of a year, and end of year for non-investment cash flows.

Graph 6 Historical Assets Values From June 30, 2012-2021

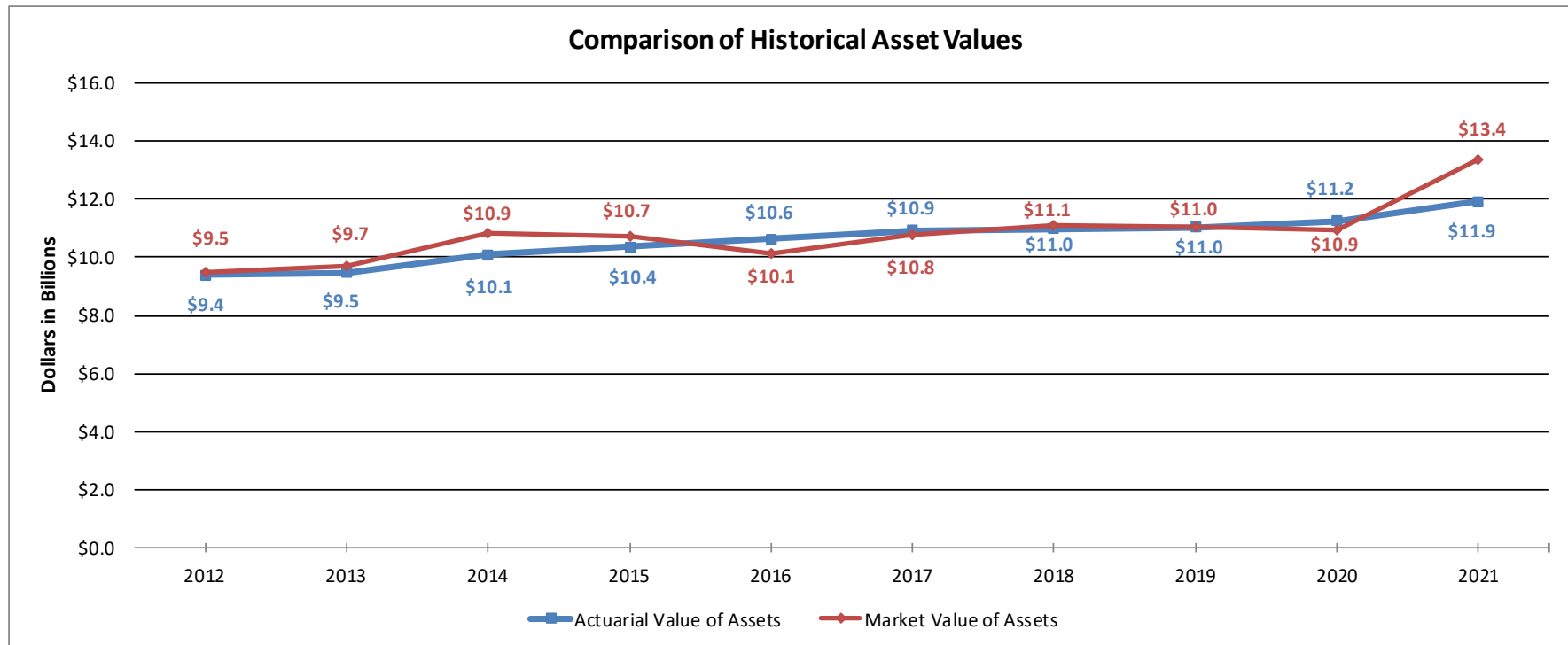
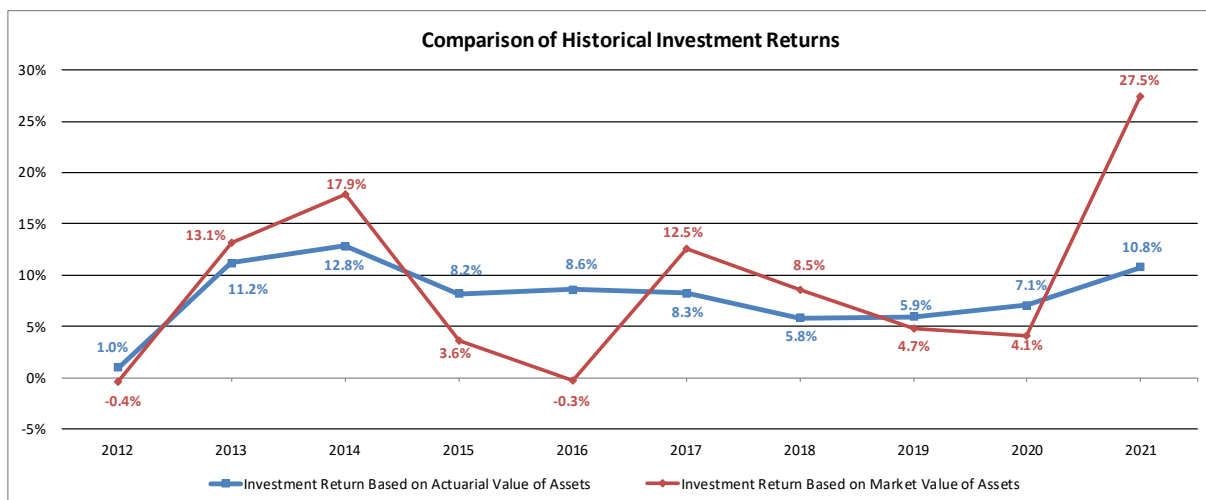


Table 10 Historical Investment Returns

Year Ended June 30,	Market Value Return	Actuarial Value Return
1997	19.8%	n/a
1998	18.2%	n/a
1999	10.7%	n/a
2000	9.5%	n/a
2001	(1.5%)	n/a
2002	(3.3%)	n/a
2003	4.0%	2.3%
2004	15.0%	3.2%
2005	10.8%	6.0%
2006	10.7%	9.6%
2007	17.7%	13.3%
2008	(5.3%)	7.9%
2009	(22.4%)	0.2%
2010	13.6%	(0.4%)
2011	24.8%	(0.5%)
2012	(0.4%)	1.0%
2013	13.1%	11.2%
2014	17.9%	12.8%
2015	3.6%	8.2%
2016	(0.3%)	8.6%
2017	12.5%	8.3%
2018	8.5%	5.8%
2019	4.7%	5.9%
2020	4.1%	7.1%
2021	27.5%	10.8%
Average Returns		
Last 10 Years:	8.8%	7.9%
Last 25 Years:	8.0%	n/a

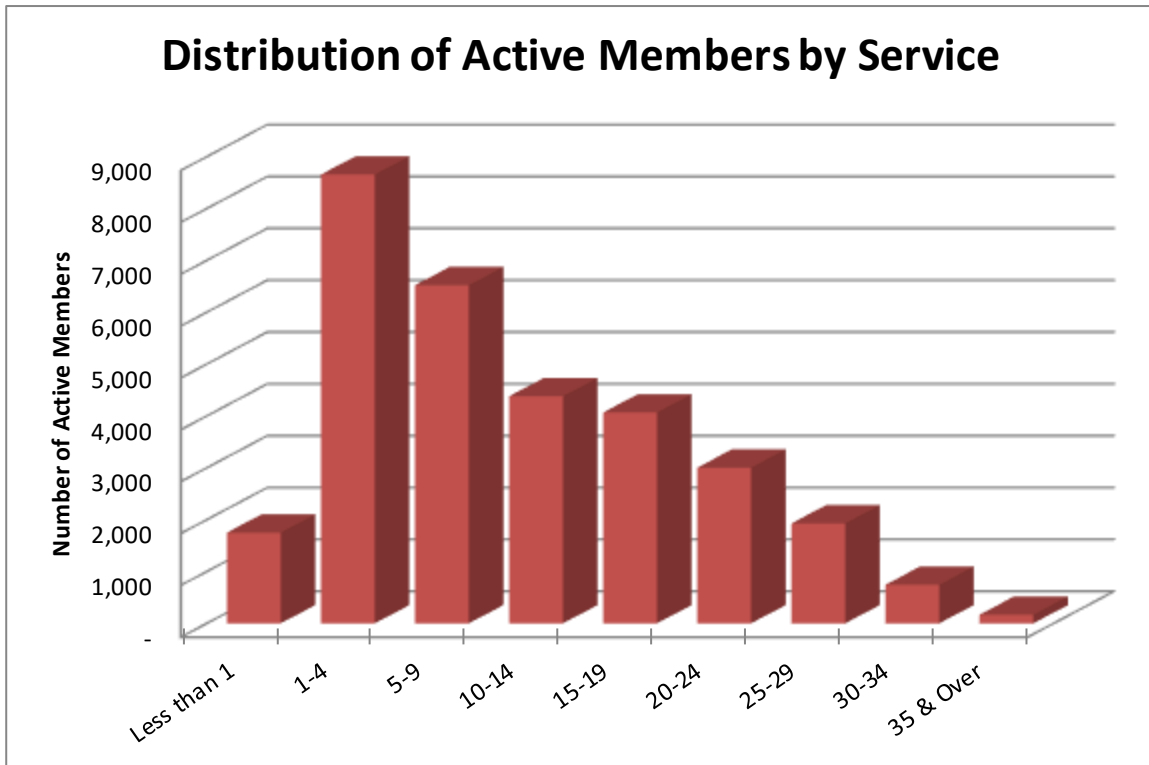
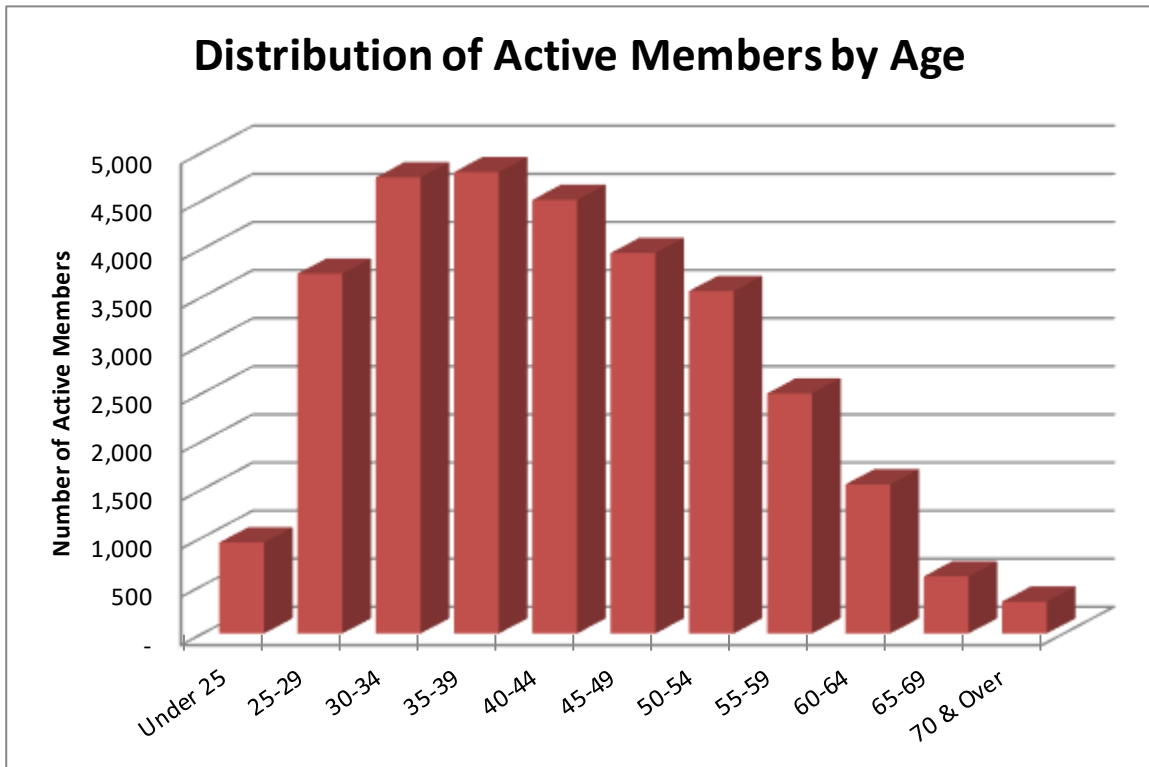


SECTION F

PARTICIPANT DATA

Graph 7

Active Members Classified by Age and Service



Graph 8 Retirees Classified by Benefit Amount and Age

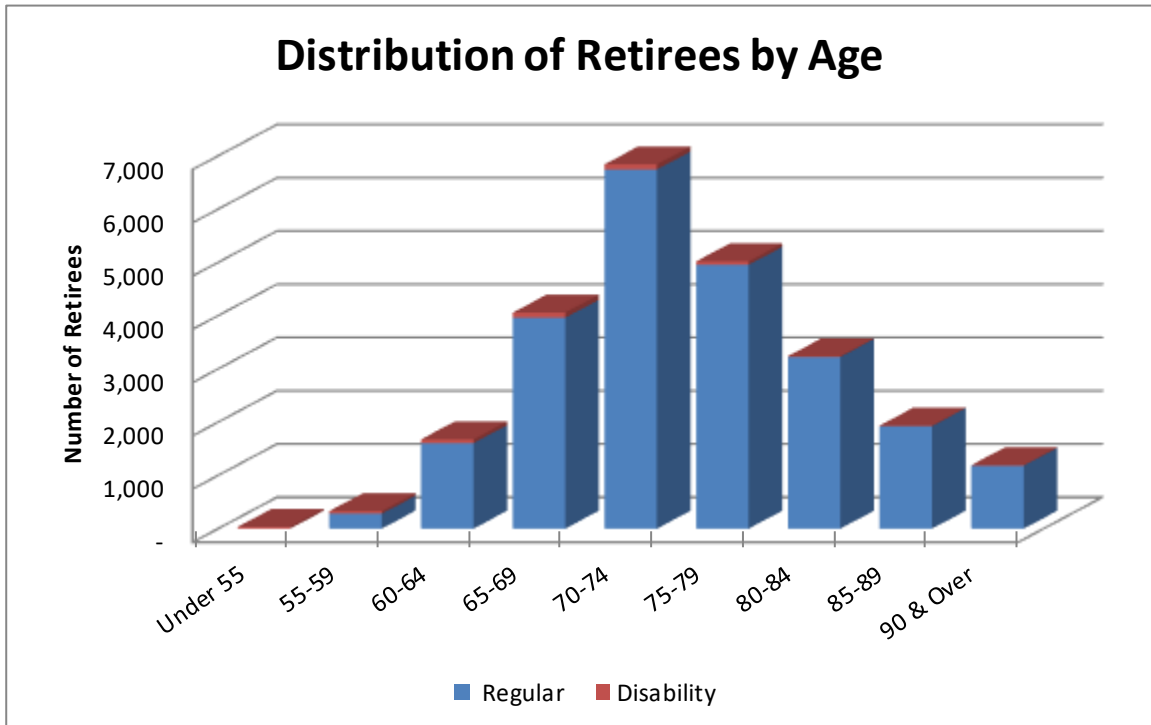
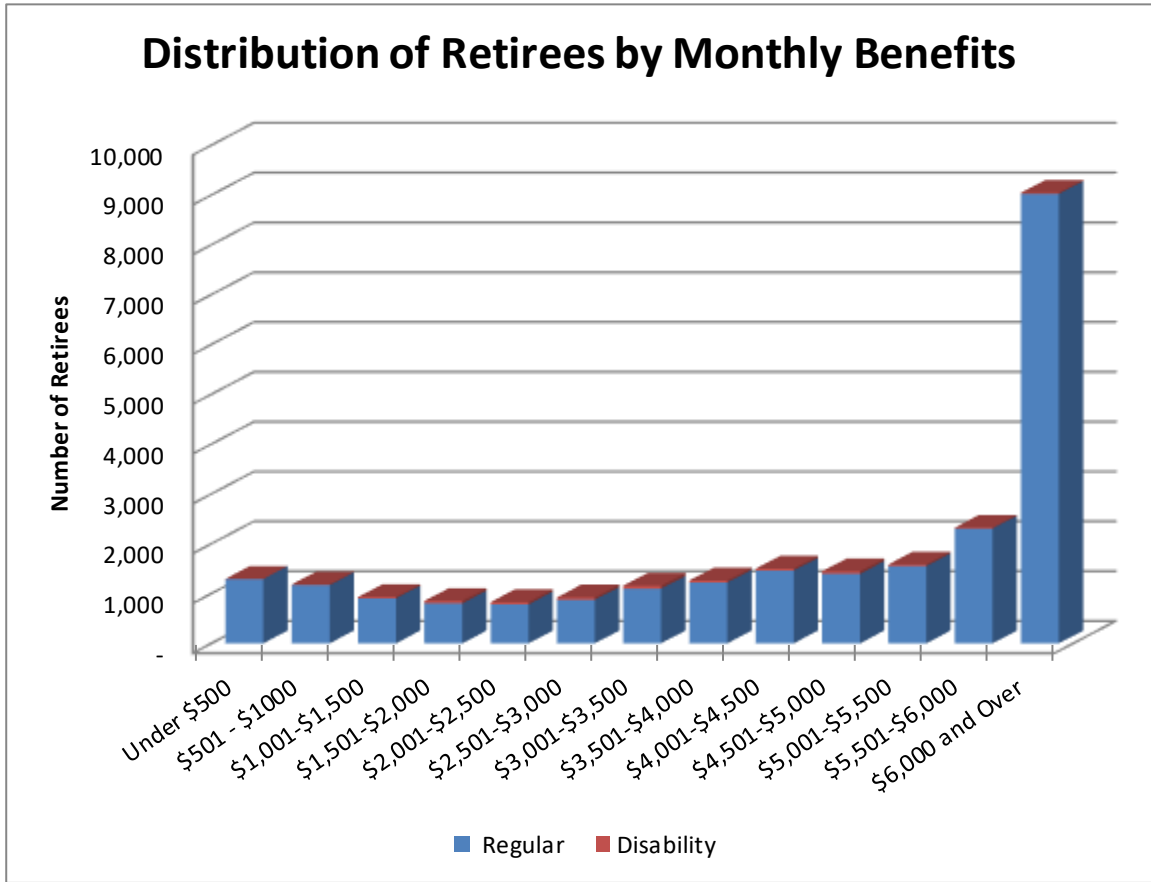


Table 11
Summary of Fund Membership

	Year Ended		Change from Prior Year
	June 30, 2021	June 30, 2020	
Active Members			
Number ^a	31,215	30,091	3.7%
Average Age	42.6	42.5	
Average Service	11.1	11.0	
Total Salary Supplied by Fund	\$2,372,166,562	\$2,249,491,403	5.5%
Average Annual Salary	\$75,994	\$74,756	1.7%
Total Active Vested Participants	16,382	16,266	0.7%
Male Members	7,356	7,087	3.8%
Female Members	23,859	23,004	3.7%
Tier 1 Members	17,815	18,118	-1.7%
Tier 2 Members	13,400	11,973	11.9%
Inactive Vested Members^b			
Number	6,658	10,024	-33.6%
Average Age	49.0	47.7	
Average Service (Excluding Reciprocal Service)	10.6	7.8	
Inactive Non-Vested Members			
Number	24,997	21,260	17.6%
Retirees			
Number	23,877	24,293	-1.7%
Average Age	75.5	75.0	
Average Annual Benefit	\$58,726	\$57,162	2.7%
Total Annual Benefit	\$1,402,209,485	\$1,388,627,977	1.0%
Disabled Retirees			
Number	445	460	-3.3%
Average Age	68.5	68.1	
Average Annual Benefit	\$41,634	\$40,373	3.1%
Total Annual Benefit	\$18,527,052	\$18,571,456	-0.2%
Beneficiaries (Including Children)			
Number	3,288	3,262	0.8%
Average Age	77.9	77.4	
Average Annual Benefit	\$25,937	\$25,000	3.7%
Total Annual Benefit	\$85,279,477	\$81,549,497	4.6%
Total Members	90,480	89,390	1.2%

^a Active count excludes members expected to be hired to replace retirements and terminations that occurred in June.

^b Includes reciprocal service.



Table 12
Member Population and Ratio of Non-Actives to Actives

Year Ended June 30,	Active Participants ^a	Vested Terminated Participants ^b	Retirees and Beneficiaries	Ratio of Non- Actives to Actives
2008	32,086	3,479	23,920	0.85
2009	31,905	3,056	24,218	0.85
2010	31,012	3,554	24,600	0.91
2011	30,133	4,253	25,199	0.98
2012	30,366	4,245	25,926	0.99
2013	30,969	4,502	27,440	1.03
2014	30,654	4,818	27,722	1.06
2015	29,706	5,464	28,114	1.13
2016	29,543	5,715	28,298	1.15
2017	28,855	6,062	28,439	1.20
2018	28,958	9,398	28,549	1.31
2019	29,295	9,926	28,317	1.31
2020	30,091	10,024	28,015	1.26
2021	31,215	6,658	27,610	1.10

^a Active count excludes members expected to be hired to replace retirements and terminations that occurred in June.

^b Excludes non-vested terminated participants due a refund of member contributions.

Table 13
Total Lives and Annual Salaries of Active Members Classified by Age
and Years of Service as of June 30, 2021

Attained Age	Completed Years of Service										Total
	Under 1	1-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over		
Under 20	-	-	-	-	-	-	-	-	-	-	-
	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
20-24	232	714	-	-	-	-	-	-	-	-	946
	\$ 3,254,993	\$ 38,026,176	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 41,281,169
25-29	410	2,731	599	-	-	-	-	-	-	-	3,740
	\$ 5,483,233	\$ 156,516,267	\$ 39,458,827	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 201,458,327
30-34	273	1,845	2,251	372	-	-	-	-	-	-	4,741
	\$ 3,734,416	\$ 107,934,203	\$ 161,410,392	\$ 31,844,495	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 304,923,506
35-39	185	1,060	1,574	1,595	382	-	-	-	-	-	4,796
	\$ 2,775,310	\$ 62,774,482	\$ 117,068,863	\$ 144,966,549	\$ 38,026,703	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 365,611,907
40-44	156	705	784	1,001	1,508	353	-	-	-	-	4,507
	\$ 1,951,671	\$ 41,011,601	\$ 57,952,923	\$ 92,138,867	\$ 150,054,236	\$ 37,386,959	\$ -	\$ -	\$ -	\$ -	\$ 380,496,256
45-49	140	509	486	567	931	1,059	263	-	-	-	3,955
	\$ 1,840,824	\$ 28,468,283	\$ 35,282,359	\$ 51,461,869	\$ 92,464,700	\$ 110,588,618	\$ 29,344,833	\$ -	\$ -	\$ -	\$ 349,451,487
50-54	100	405	333	396	553	783	809	180	-	-	3,559
	\$ 1,347,039	\$ 21,137,449	\$ 24,048,017	\$ 34,928,207	\$ 53,752,823	\$ 79,832,191	\$ 87,775,422	\$ 20,510,777	\$ -	\$ -	\$ 323,331,924
55-59	98	306	229	200	347	434	501	345	36	-	2,496
	\$ 1,088,941	\$ 15,725,402	\$ 15,768,499	\$ 17,007,476	\$ 32,954,913	\$ 43,707,773	\$ 52,651,429	\$ 37,288,948	\$ 4,014,562	\$ -	\$ 220,207,943
60-64	67	210	142	162	218	263	256	155	77	-	1,550
	\$ 507,551	\$ 8,354,076	\$ 8,685,661	\$ 12,422,239	\$ 19,702,973	\$ 26,346,551	\$ 26,543,810	\$ 16,142,349	\$ 8,760,448	\$ -	\$ 127,465,658
65-69	49	89	78	49	90	85	72	51	31	-	594
	\$ 321,411	\$ 2,274,763	\$ 3,911,142	\$ 3,128,955	\$ 8,033,343	\$ 8,362,687	\$ 7,519,170	\$ 5,282,436	\$ 3,490,629	\$ -	\$ 42,324,533
70 & Over	40	82	46	37	38	26	26	13	23	-	331
	\$ 196,517	\$ 1,232,077	\$ 1,630,355	\$ 1,514,116	\$ 2,393,329	\$ 2,275,447	\$ 2,414,754	\$ 1,287,250	\$ 2,670,006	\$ -	\$ 15,613,852
Total	1,750	8,656	6,522	4,379	4,067	3,003	1,927	744	167	-	31,215
	\$ 22,501,908	\$ 483,454,777	\$ 465,217,037	\$ 389,412,772	\$ 397,383,020	\$ 308,500,226	\$ 206,249,418	\$ 80,511,759	\$ 18,935,644	\$ -	\$ 2,372,166,562

Total lives and annual salaries exclude 26 members expected to be hired to replace retirements and terminations that occurred in June 2021.



Table 14
Reconciliation of Member Data as of June 30, 2021

	Actives	Deferred Vested	Expected Refunds	Retirees	Disabilities	Beneficiaries	Total
Totals as of the June 30, 2020 Actuarial Valuation	30,091	10,024	21,260	24,293	460	3,262	89,390
New Entrants	2,624	-	-	-	-	-	2,624
Rehires — Members with Service	549	(177)	(372)	-	-	-	-
Non-Vested Terminations	(1,236)	(3,257)	4,493	-	-	-	-
Vested Terminations	(359)	360	(1)	-	-	-	-
Service Retirements	(289)	(174)	-	465	(2)	-	-
Disabilities	(8)	(3)	-	-	11	-	-
Deaths	(30)	(19)	(16)	(885)	(24)	(210)	(1,184)
New Beneficiaries	-	-	-	-	-	236	236
Refunds and Benefit Terminations	(128)	(100)	(481)	-	-	-	(709)
Data Adjustments	1	4	114	4	-	-	123
Net Change	1,124	(3,366)	3,737	(416)	(15)	26	1,090
Totals as of the June 30, 2021 Actuarial Valuation	31,215	6,658	24,997	23,877	445	3,288	90,480

Active count excludes members expected to be hired to replace retirements and terminations that occurred in June.

Table 15
History of Retirees and Beneficiaries Added to Rolls during
Fiscal Year Ended June 30, 2021

Fiscal Year	Added to Rolls		Removed from Rolls		Rolls - End of Year		Average Annual Allowances	Increase in Avg. Annual Allowance
	No.	Annual Allowance	No.	Annual Allowance	No.	Annual Allowance		
2012	1,579	\$ 96,719,811	852	\$ 28,511,983	25,926	\$ 1,116,080,887	\$ 43,049	3.52%
2013	2,129	130,553,477	615	21,764,846	27,440	1,224,869,518	44,638	3.69%
2014	1,006	70,963,134	724	26,376,522	27,722	1,269,456,130	45,792	2.59%
2015	1,302	85,087,053	910	34,678,799	28,114	1,319,864,384	46,947	2.52%
2016	1,101	78,909,433	917	36,891,261	28,298	1,361,882,556	48,126	2.51%
2017	1,072	79,434,960	931	37,328,244	28,439	1,403,989,272	49,368	2.58%
2018	1,025	79,219,962	915	39,123,440	28,549	1,444,085,794	50,583	2.46%
2019	708	67,514,478	940	42,557,730	28,317	1,469,042,542	51,878	2.56%
2020	792	71,924,782	1,094	52,218,394	28,015	1,488,748,930	53,141	2.43%
2021	716	70,519,407	1,121	53,252,323	27,610	1,506,016,014	54,546	2.64%

Table 16
Number of Annuitants Classified by Benefit Type and Amount as of June 30, 2021

Amount of Monthly Benefit	Retirees		Disabled Retirees		Beneficiaries		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
\$ 1-500	349	944	1	1	157	229	507	1,174
501-1000	333	837	3	9	152	292	488	1,138
1,001-1,500	270	633	8	20	159	203	437	856
1,501-2,000	235	567	7	42	152	189	394	798
2,001-2,500	185	598	10	35	143	223	338	856
2,501-3,000	195	679	8	41	176	256	379	976
3,001-3,500	239	858	12	47	178	372	429	1,277
3,501-4,000	279	943	9	32	34	118	322	1,093
4,001-4,500	266	1,195	11	28	19	79	296	1,302
4,501-5,000	280	1,114	9	42	16	50	305	1,206
5,001-5,500	330	1,222	5	26	7	30	342	1,278
5,501-6,000	542	1,763	4	12	7	24	553	1,799
6,001-6,500	678	2,203	2	8	4	12	684	2,223
6,501-7,000	584	1,945	2	2	1	3	587	1,950
7,001-7,500	251	882	1	-	-	1	252	883
7,501-8,000	170	406	2	1	-	-	172	407
8,001-8,500	142	229	1	1	-	-	143	230
8,501-9,000	82	195	-	1	-	-	82	196
9,001-9,500	86	181	1	-	-	1	87	182
Over \$9,500	320	667	1	-	-	1	321	668
Totals	5,816	18,061	97	348	1,205	2,083	7,118	20,492

Table 17
Initial Year of Retirement Analysis

	Years of Credited Service							Total
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	
Fiscal Year 2017								
Avg Monthly Annuity	\$ 323	\$ 734	\$ 1,578	\$ 2,516	\$ 3,438	\$ 4,301	\$ 5,684	\$ 3,466
Avg Monthly FAS	\$ 6,255	\$ 4,332	\$ 5,819	\$ 6,705	\$ 7,268	\$ 7,612	\$ 7,975	\$ 6,961
Number of Retirees	38	80	83	99	167	129	219	815
Average Age								63.7
Fiscal Year 2018								
Avg Monthly Annuity	\$ 336	\$ 823	\$ 1,503	\$ 2,578	\$ 3,471	\$ 4,505	\$ 5,867	\$ 3,382
Avg Monthly FAS	\$ 6,507	\$ 5,349	\$ 5,502	\$ 6,738	\$ 7,407	\$ 7,927	\$ 8,166	\$ 7,089
Number of Retirees	39	92	81	88	175	122	171	768
Average Age								63.2
Fiscal Year 2019								
Avg Monthly Annuity	\$ 305	\$ 699	\$ 1,634	\$ 2,547	\$ 3,672	\$ 4,789	\$ 6,009	\$ 3,150
Avg Monthly FAS	\$ 6,069	\$ 4,827	\$ 6,098	\$ 6,673	\$ 7,644	\$ 8,482	\$ 8,446	\$ 7,046
Number of Retirees	42	64	64	62	77	62	94	465
Average Age								63.7
Fiscal Year 2020								
Avg Monthly Annuity	\$ 318	\$ 768	\$ 1,615	\$ 2,578	\$ 3,587	\$ 4,659	\$ 6,170	\$ 3,211
Avg Monthly FAS	\$ 6,442	\$ 5,315	\$ 5,859	\$ 6,746	\$ 7,717	\$ 8,076	\$ 8,578	\$ 7,179
Number of Retirees	49	76	51	72	114	98	91	551
Average Age								63.5
Fiscal Year 2021								
Avg Monthly Annuity	\$ 349	\$ 883	\$ 1,638	\$ 2,850	\$ 3,652	\$ 4,780	\$ 6,439	\$ 3,500
Avg Monthly FAS	\$ 7,335	\$ 6,180	\$ 6,087	\$ 7,363	\$ 7,771	\$ 8,371	\$ 8,887	\$ 7,645
Number of Retirees	39	54	49	71	86	67	103	469
Average Age								63.9

Table 18
Schedule of Active Member Payroll

Valuation Date June 30,	Number	Covered Payroll	Average Annual Payroll	% Increase in Avg. Payroll
2012	30,366	\$2,224,903,121	\$ 73,270	
2013	30,969	2,239,347,051	72,309	-1.31%
2014	30,654	2,233,280,995	72,854	0.75%
2015	29,706	2,273,551,432	76,535	5.05%
2016	29,543	2,281,268,890	77,219	0.89%
2017	28,855	2,030,175,116	70,358	-8.88%
2018	28,958	2,094,830,446	72,340	2.82%
2019	29,295	2,179,054,844	74,383	2.82%
2020	30,091	2,249,491,403	74,756	0.50%
2021	31,215	2,372,166,562	75,994	1.66%

Table 19
Solvency Test

Valuation Date June 30,	Total Actuarial Accrued Liability	(1) Active Member Contributions	(2) Retirees, Term Vested and Beneficiaries	(3) Active Members (Employer Financed Portion)	Actuarial Value of Assets	Portion (%) of Present Value Covered By Assets		
						(1)	(2)	(3)
2017	\$ 21,822,010,297	\$ 1,608,474,476	\$ 16,244,526,663	\$ 3,969,009,158	\$ 10,933,031,685	100%	57%	0%
2018	22,922,992,558	1,659,408,813	17,510,678,092	3,752,905,653	10,969,085,523	100%	53%	0%
2019	23,252,163,307	1,752,007,367	17,532,864,523	3,967,291,417	11,021,811,634	100%	53%	0%
2020	24,073,482,607	1,851,487,971	17,866,192,151	4,355,802,485	11,240,208,045	100%	53%	0%
2021	25,117,988,742	1,981,699,714	18,127,858,688	5,008,430,340	11,925,535,283	100%	55%	0%

10 fiscal years will be built prospectively.

Table 20
Participating Employers

Participating Employer	2021		2020	
	Covered Employees	% of Total CTPF Membership	Covered Employees	% of Total CTPF Membership
Chicago Public Schools	26,319	84.32%	25,450	84.58%
Noble Network of Charter Schools	787	2.52%	738	2.45%
UNO Charter School Network	693	2.22%	690	2.29%
Learn Charter School Network	268	0.86%	264	0.88%
Distinctive Schools	205	0.66%	198	0.66%
KIPP Chicago Schools	192	0.62%	209	0.69%
Concept Schools	183	0.59%	168	0.56%
Charter Schools USA	178	0.57%	174	0.58%
Civitas Schools	162	0.52%	168	0.56%
Perspectives Charter Schools	155	0.50%	118	0.39%
Total, Largest 10 Employers	29,142	93.36%	28,177	93.64%
All Other Employers	2,073	6.64%	1,914	6.36%
Grand Total	31,215	100.00%	30,091	100.00%

The total number of covered employees from the largest 10 employers in 2020 was 28,191. This differs slightly from the number shown above due to a difference in the 10th largest employer in 2021 compared to 2020.

SECTION G

ACTUARIAL METHODS AND ASSUMPTIONS

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Actuarial Cost Method as Mandated by 40 ILCS 5/17-129, Adopted August 31, 1991

The Projected Unit Credit normal cost method is used. Under this method, the projected pension at retirement age is first calculated and the present value at the individual member's current or attained age is determined. The normal cost for the member for the current year is equal to the actuarial present value divided by the member's projected service at retirement. The normal cost for the plan for the year is the sum of the individual normal costs.

The actuarial liability at any point in time is the present value of the projected pensions at that time less the present value of future normal costs.

For ancillary benefits for active members, in particular death and survivor benefits, termination benefits and the postretirement increases, the same procedure as outlined above is followed.

Estimated annual administrative expenses are added to the normal cost.

For actuarial valuation purposes, as well as projection purposes, an actuarial value of assets is used. The actuarial value of assets is projected to equal about 100 percent of the market value on and after June 30, 2027.

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Actuarial Assumptions

Actuarial assumptions are set by the Board of Trustees. All actuarial assumptions are expectations of future experience and are not market measures. The rationale for the actuarial assumptions may be found in the 2018 Actuarial Experience Study issued on May 25, 2018 and the 2021 Actuarial Assumption Study issued on September 14, 2021.

Rate of Investment Return

6.50 percent per year, compounded annually, net of investment expenses. First effective with the actuarial valuation as of June 30, 2021.

Price Inflation (Increase in Consumer Price Index “CPI”)

2.25 percent per annum, compounded annually. First effective with the actuarial valuation as of June 30, 2020.

This assumption serves as the basis for the determination of annual increases in pension and the pensionable salary cap for Tier 2 members.

Cost of Living Adjustment “COLA”

The assumed rate is 3.00 percent per year for members hired before January 1, 2011, based on the benefit provision of 3.00 percent annual compound increases. The assumed rate is 1.125 percent for members hired on and after January 1, 2011, based on the benefit provision of increases equal to $\frac{1}{2}$ of the increase in CPI-U with a maximum increase of 3.00 percent. First effective with the actuarial valuation as of June 30, 2020.

Wage Inflation

2.75 percent per annum, compounded annually. First effective with the actuarial valuation as of June 30, 2020.

Calculation of the Actuarially Determined Contribution

The amortization factor used to calculate the ADC is based on the Fund’s assumed interest rate of 6.50 percent and an annualized assumed rate of increase in total capped payroll of 2.00 percent (which is consistent with the projected increase in total payroll from the projections used to calculate the statutory contribution requirements). The Employer Normal Cost and Amortization Payment are adjusted for expected contribution timing.



Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Total Payroll

Unless stated otherwise, total payroll includes employee contributions of 7.00 percent of salary picked up by the Board of Education for employees hired prior to January 1, 2017. All contributions are calculated based on total payroll.

Mortality

Applicable Group	Base Mortality Table	Male Scaling Factor	Female Scaling Factor
Pre-retirement Mortality	RP-2014 White Collar Employee, sex distinct	98%	113%
Post-retirement Disabled Mortality	RP-2014 Disabled Annuitant, sex distinct	103%	106%
Post-retirement Healthy Mortality	RP-2014 White Collar Healthy Annuitant, sex distinct	108%	94%

Future mortality improvements are reflected by projecting the base mortality tables back from the year 2014 to the year 2006 using the Society of Actuaries (SOA) MP-2014 (referred to as the RP-2006 base mortality tables) and projecting from 2006 using the MP-2017 projection scale. The assumptions are generational mortality tables and include a margin for improvement.

Age	Future Life Expectancy (years) in 2021				Future Life Expectancy (years) in 2030			
	Post-retirement Healthy		Post-retirement Disabled		Post-retirement Healthy		Post-retirement Disabled	
	Male	Female	Male	Female	Male	Female	Male	Female
35	51.25	54.50	34.44	40.81	52.13	55.34	35.90	42.14
40	46.06	49.31	30.70	36.36	46.93	50.13	32.03	37.60
45	40.97	44.18	27.40	32.25	41.81	44.98	28.60	33.41
50	35.97	39.08	24.23	28.29	36.79	39.87	25.34	29.37
55	31.09	34.04	21.12	24.52	31.88	34.81	22.16	25.53
60	26.34	29.12	18.10	21.02	27.09	29.86	19.03	21.93
65	21.76	24.40	15.24	17.65	22.46	25.09	16.03	18.44
70	17.43	19.89	12.51	14.34	18.06	20.53	13.18	15.02
75	13.44	15.64	9.92	11.23	13.99	16.22	10.48	11.84

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Termination

Service-based termination rates were used. Sample rates are as follows:

Termination			
Service (Beginning of Year)	Rate (%)	Service (Beginning of Year)	Rate (%)
0	30.00%	16	2.25%
1	16.00%	17	2.25%
2	13.00%	18	2.25%
3	12.00%	19	2.25%
4	9.00%	20	2.25%
5	9.00%	21	2.25%
6	8.00%	22	2.25%
7	6.00%	23	2.25%
8	5.00%	24	2.25%
9	5.00%	25	2.25%
10	4.00%	26	2.25%
11	3.00%	27	2.25%
12	3.00%	28	2.25%
13	3.00%	29	2.25%
14	3.00%	30	1.75%
15	3.00%	31+	1.75%

It is assumed that terminated employees will not be rehired. The rates apply only to employees who have not fulfilled the service requirement necessary for retirement at any given age.

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Salary Increases

Illustrative rates of increase per individual employee per year, compounded annually:

Age	Annual Increase
20	12.60%
25	7.50%
30	6.00%
35	5.25%
40	4.25%
45	3.50%
50	3.00%
55	2.75%
60	2.75%
65	2.75%
70	2.75%

The underlying salary increase assumption is based on a wage inflation assumption of 2.75 percent per year. First effective with the actuarial valuation as of June 30, 2020.

Disability

Disability rates, based on recent experience of the Fund, were applied to members with at least 10 years of service. All disabilities are assumed to be non-duty disabilities. Sample rates are as follows:

Age	Rate (%)
20	0.04%
25	0.04%
30	0.04%
35	0.05%
40	0.06%
45	0.08%
50	0.19%
55	0.24%
60	0.29%

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Retirement

Employees are assumed to retire in accordance with the rates shown below. The rates apply only to employees who have fulfilled the service requirement necessary for retirement at any given age.

Retirement Rates for Tier 1 Employees		
Age	<34 Years of Service Rate (%)	34+ Years of Service Rate (%)
55	5.00%	20.00%
56	5.00%	20.00%
57	5.00%	20.00%
58	5.00%	20.00%
59	7.00%	20.00%
60	9.00%	22.50%
61	11.00%	22.50%
62	12.00%	22.50%
63	13.00%	22.50%
64	14.00%	22.50%
65	15.00%	25.00%
66	16.00%	25.00%
67	17.00%	25.00%
68	18.00%	27.50%
69	19.00%	27.50%
70	20.00%	30.00%
71	20.00%	30.00%
72	20.00%	30.00%
73	20.00%	30.00%
74	20.00%	30.00%
75	100.00%	100.00%

Retirement Rates for Tier 2 Employees	
Age	Rate (%)
62	40.00%
63	25.00%
64	25.00%
65	30.00%
66	25.00%
67	30.00%
68	20.00%
69	20.00%
70	20.00%
71	20.00%
72	20.00%
73	20.00%
74	20.00%
75	100.00%

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Active Member Population as of the Actuarial Valuation Date

The Tier 2 active population as of the actuarial valuation date of June 30, 2021, was increased by 26 members in order to estimate the total expected number of active members that will be working and making contributions in the upcoming fiscal year. Members who retire at the end of the school year have June retirement dates and are already reflected as retirees in the data received as of June 30, but new active members to replace these members are not hired until August or September and are not included in the census data until the following fiscal year. These members are assumed to have a similar demographic profile as new entrants who have been hired in the last three years.

Population Projection

For purposes of determining annual appropriation as a percent of total covered payroll, the size of the active group is assumed to remain level at the number of actives as of the actuarial valuation date including expected new hires, or 31,241. New entrants are assumed to enter with an average age and an average pay as disclosed below. New entrants are assumed to have a similar demographic profile of recent new entrants to the Fund (as shown in the table below). The average increase in uncapped payroll for the projection period is 2.75 percent per year.

New Entrant Profile		
Age Group	No.	Salary
Under 20		
20-24	1,138	\$ 55,859,339
25-29	1,526	78,297,901
30-34	911	48,392,365
35-39	552	30,427,846
40-44	395	20,197,677
45-49	295	14,869,670
50-54	253	12,738,150
55-59	164	7,141,680
60-64	105	3,478,723
65-69	16	401,802
70 & Over		
Total	5,355	\$ 271,805,153
Avg. Salary		\$ 50,757
Avg. Age		32.99
Percent Female		76%

Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Assets

The asset values used for the actuarial valuation were based on asset information contained in the financial statements for the year ended June 30, 2021, as prepared by the Fund. The actuarial value of assets was determined by smoothing unexpected gains or losses over a period of four years. The investment gain or loss for a year is calculated as the total investment income on the market value of assets, minus expected investment return on the prior actuarial value of assets. The final actuarial value is equal to the expected actuarial value plus (or minus) 25 percent of the calculated gain (or loss) in the prior four years.

Expenses

Administrative expenses included in the normal cost for fiscal year 2022 are the budgeted administrative expense amount of \$23,287,480, as provided by Staff. Future administrative expenses are assumed to increase by 5.75 percent per year for 14 years and then increase at a rate consistent with the increase in projected capped payroll thereafter.

Marriage Assumption

75.0 percent of active male participants and 65.0 percent of active female participants are assumed to be married. Actual marital status at benefit commencement is used for retirees.

Spouse's Age

The female spouse is assumed to be two years younger than the male spouse.

Total Service at Retirement

A teacher's total service credit at retirement is assumed to be 103.3 percent of the teacher's regular period of service at retirement.

Valuation of Inactive Members Eligible for Deferred Vested Pension Benefits

Benefits for inactive deferred vested members were determined by projecting the accumulated contribution balance to retirement (age 62 for members hired before January 1, 2011 and age 67 for members hired on or after January 1, 2011) with interest at the assumed investment rate of return, converted to an annuity, and then loaded by 35 percent.

Assumption for Missing Data

Members whose gender was not provided are assumed to be female.



Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Benefit Option

Retirees whose record includes a spouse date of birth are assumed to have the automatic 50% Joint and Survivor benefit. All other retirees are assumed to have a straight life benefit.

Data Adjustments

The pay reported by CTPF for the 2021 actuarial valuation was based on 27 pay periods (included an additional pay period). An approximation of 26/27 was applied to the pay provided. Additionally, it was assumed the adjusted valuation pay would not be lower than the pay provided for the last actuarial valuation.

Contribution Timing

Projected employer contributions are assumed to occur based on the following timing:

1. Additional Board of Education Contribution (0.58 percent of pay) — June 30 (End of Year)
2. Additional State Contribution (0.544 percent of pay) — Monthly (Middle of Year)
3. State Normal Cost Contribution — Monthly (Middle of Year)
4. Board of Education Early Payment of Special Tax Levy — March 1, annually
 - a. A portion of the prior year's tax levy is assumed to occur each March 1
 - i. The payments made through March 31 (which are assumed to be paid on March 1 on average) as provided by CTPF is equal to \$245,254,621 for fiscal year 2021 and is assumed to increase three percent per year.
5. Remaining Board of Education Contribution — June 30 (End of Year)

Decrement Timing

All decrements are assumed to occur during the middle of the year.

Decrement Relativity

Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

Decrement Operation

Turnover decrements do not operate after a member reaches retirement eligibility. Disability decrements do not operate after a member reaches normal retirement eligibility.

Eligibility Testing

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



Actuarial Methods and Assumptions (Most Adopted Effective with the June 30, 2018 Actuarial Valuation)

Assumptions as a Result of Public Act 96-0889

Members hired on or after January 1, 2011, are assumed to make contributions on salary up to the final average compensation cap in a given year.

State contributions, expressed as a percentage of pay, are calculated based upon capped pay.

Capped (pensionable) pay was \$116,740 for fiscal year 2021 and increases at ½ the annual increase in the Consumer Price Index-U thereafter.

The annual increase in the Consumer Price Index-U is assumed to be 2.25 percent for all years. First effective with the actuarial valuation as of June 30, 2020.



Projection Methodology and Appropriation Requirements under P.A. 90-0655, P.A. 91-0357, P.A. 96-0889, P.A. 99-0521 and P.A. 100-0465

Employer Contributions under P.A. 96-0889

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/17-129 (b)(iv)-(b)(vii):

(iv) For fiscal years 2014 through 2059, the minimum contribution to the Fund to be made by the Board of Education in each fiscal year shall be an amount determined by the Fund to be sufficient to bring the total assets of the Fund up to 90% of the total actuarial liabilities of the Fund by the end of fiscal year 2059. In making these determinations, the required Board of Education contribution shall be calculated each year as a level percentage of the applicable employee payrolls over the years remaining to and including fiscal year 2059 and shall be determined under the Projected Unit Credit actuarial cost method.

(v) Beginning in fiscal year 2060, the minimum Board of Education contribution for each fiscal year shall be the amount needed to maintain the total assets of the Fund at 90% of the total actuarial liabilities of the Fund.

(vi) Notwithstanding any other provision of this subsection (b), for any fiscal year, the contribution to the Fund from the Board of Education shall not be required to be in excess of the amount calculated as needed to maintain the assets (or cause the assets to be) at the 90% level by the end of the fiscal year.

(vii) Any contribution by the State to or for the benefit of the Fund, including, without limitation, as referred to under Section 17-127, shall be a credit against any contribution required to be made by the Board of Education under this subsection (b).

Additional State and Employer Contributions under P.A. 90-0655 and P.A. 91-0357

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/17-127 (b):

(b) The General Assembly finds that for many years the State has contributed to the Fund an annual amount that is between 20% and 30% of the amount of the annual State contribution to the Article 16 retirement system, and the General Assembly declares that it is its goal and intention to continue this level of contribution to the Fund in the future. Beginning in State fiscal year 1999, the State shall include in its annual contribution to the Fund an additional amount equal to 0.544% of the Fund's total teacher payroll; except that this additional contribution need not be made in a fiscal year if the Board has certified in the previous fiscal year that the Fund is at least 90% funded, based on actuarial determinations. These additional State contributions are intended to offset a portion of the cost to the Fund of the increases in retirement benefits resulting from this amendatory Act of 1998.

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/17-127.2 (1)-(2):

Sec. 17-127.2. Additional contributions by employer of teachers. Beginning July 1, 1998, the employer of a teacher shall pay to the Fund an employer contribution computed as follows:



Projection Methodology and Appropriation Requirements under P.A. 90-0655, P.A. 91-0357, P.A. 96-0889, P.A. 99-0521 and P.A. 100-0465

(1) Beginning July 1, 1998 through June 30, 1999, the employer contribution shall be equal to 0.3% of each teacher's salary.

(2) Beginning July 1, 1999 and thereafter, the employer contribution shall be equal to 0.58% of each teacher's salary. The employer may pay these employer contributions out of any source of funding available for that purpose and shall forward the contributions to the Fund on the schedule established for the payment of member contributions. These employer contributions need not be made in a fiscal year if the Board has certified in the previous fiscal year that the Fund is at least 90% funded, based on actuarial determinations. These employer contributions are intended to offset a portion of the cost to the Fund of the increases in retirement benefits resulting from Public Act 90-582.

Board of Education Dedicated Property Tax Levy under P.A. 99-0521 as Amended by P.A. 100-0465

The following is an excerpt from the Illinois Compiled statutes 105 ILCS 5/34-53:

Beginning on the effective date of this amendatory Act of the 99th General Assembly, for the purpose of making an employer contribution to the Public School Teachers' Pension and Retirement Fund of Chicago, the board may levy annually for taxable years prior to 2017, upon all taxable property located within the district, a tax at a rate not to exceed 0.383%. Beginning with the 2017 taxable year, for the purpose of making an employer contribution to the Public School Teachers' Pension and Retirement Fund of Chicago, the board may levy annually, upon all taxable property within the district, a tax at a rate of 0.567%. The proceeds from this additional tax shall be paid, as soon as possible after collection, directly to the Public School Teachers' Pension and Retirement Fund of Chicago and not to the Board of Education.

State Contributions under P.A. 100-0465

The following is an excerpt from the Illinois Compiled statutes 40 ILCS 5/17-127 (d)(1)-(d)(2):

(d) In addition to any other contribution required under this Article, including the contribution required under subsection (c), the State shall contribute to the Fund the following amounts:

(1) For State fiscal year 2018, the State shall contribute \$221,300,000 for the employer normal cost for fiscal year 2018 and the amount allowed under paragraph (3) of Section 17-142.1 of this Code to defray health insurance costs. Funds to this paragraph (1) shall come from funds appropriated for Evidence-Based Funding pursuant to Section 18-8.15 of the School Code.

(2) Beginning in State fiscal year 2019, the State shall contribute for each fiscal year an amount to be determined by the Fund, equal to the employer normal cost for that fiscal year, plus the amount allowed pursuant to paragraph (3) of Section 17-142.1 to defray health insurance costs.

We calculated the required contribution based on the above legislation; the results are shown in the summary section of this report.



SECTION H

SUMMARY OF PLAN PROVISIONS

Summary of Plan Provisions (as of June 30, 2021)

It should be noted that the purpose of this section is to describe the benefit structures of CTPF for which actuarial values have been generated. Many portions of the defined plans are described in a manner which may not be legally complete or precise.

It is not our intent to provide an exhaustive description of all benefits provided under CTPF or the policies and procedures utilized by CTPF staff. A more precise description of the provisions of CTPF can be found in Illinois Compiled Statutes (ILCS) Chapter 40, Articles 1, 17 and 20. In all situations, the plan provisions described in the Statutes govern.



Summary of Plan Provisions (as of June 30, 2021)

Purpose

The Public School Teachers' Pension and Retirement Fund of Chicago, established in 1895 by the Illinois state legislature, is a defined benefit public employee retirement fund that provides retirement, survivor and disability benefits to certain teachers and employees of the Chicago Public Schools.

Administration

Responsibility for the operation of the Fund and the direction of its policies is vested in a Board of Trustees of 12 members. The 12-member Board of Trustees is comprised of six members elected by the teacher contributors, three members elected by the annuitants, one member elected by the principal contributors and two members are appointed by the Board of Education. The administration of the detailed affairs of the Fund is the responsibility of the Executive Director who is appointed by the Board of Trustees. Administrative policies and procedures are designed to ensure an accurate accounting of funds of CTPF and prompt payment of claims for benefits within the applicable statute.

Membership

Any teacher and certain other employees of the Chicago Public Schools, approved charter schools and the Chicago Teachers' Pension Fund are participants of CTPF. Members hired prior to January 1, 2011 participate under the Tier 1 benefit structure. Members hired on and after January 1, 2011 participate under the Tier 2 benefit structure.

Membership Service

Membership service includes all service rendered while a member of the Fund for which credit is allowable. Contributors to the Fund cannot earn more than one year of service credit per fiscal year. Validated service within a fiscal year is determined on a schedule of 170 days.

Member Contributions

Members are required to contribute a percentage of salary as their share of meeting the cost of the various benefits. The total contribution rate of 9.0 percent of salary consists of 7.5 percent towards the retirement pension, 1.0 percent towards the survivor pension and 0.5 percent towards the post-retirement increase.

As of September 1981, the Board of Education has been paying 7.0 percent of the required teacher contributions for Chicago public school teachers. Charter school contributions may be contributed at various rates by the employers and teachers.

As a result of the collective bargaining agreement between the Board of Education of the City of Chicago and the Chicago Teachers Union, Local No. 1, American Federation of Teachers, AFL-CIO, which became effective December 7, 2016, teachers hired on and after January 1, 2017, will no longer receive the pension pick-up of 7.0 percent from the Board of Education.



Summary of Plan Provisions (as of June 30, 2021)

Retirement Pension

Qualification of Member

A member is eligible for a retirement pension after (1) completing 20 years of validated service, with the pension payable at age 55 or older, or (2) after completing five years of service with the pension payable at age 62 or older.

Amount of Pension

The pension is based on the member's final average salary and the number of years of service credit that has been established.

Final Average Salary is the average of the highest rates of salary for any four consecutive years of validated service within the last 10 years.

For service earned before July 1, 1998, the amount of the service retirement pension is 1.67 percent of final average salary for the first 10 years, 1.90 percent for each of the next 10 years, 2.10 percent for each of the following 10 years and 2.30 percent for each year above 30. For service earned after June 30, 1998, the amount of the service retirement pension is 2.2 percent of final average salary for each year of service.

Service earned before July 1, 1998, can be upgraded to the 2.2 percent formula through the payment of additional employee contributions of 1 percent of the teacher's highest salary within the last four years for each year of prior service, up to a maximum of 20 percent, which upgrades all service years. The number of years for which contributions are required is reduced by one for each three full years of service after June 30, 1998. No contribution is required if the member has at least 30 years of service.

The maximum pension payable is 75 percent of final average salary or \$1,500 per month, whichever is greater.

Annual Increases in Pension

Postretirement increases of 3.0 percent of the current pension (i.e., increases are compounded) are granted to members effective each January 1, occurring on or after the first anniversary of the pension or the 61st birthday, whichever is later.

Reductions

Except for retirement after 34 years of service, the retirement pension is reduced by $\frac{1}{2}$ of 1.0 percent for each month the member is under age 60.



Summary of Plan Provisions (as of June 30, 2021)

Survivors Annuity

Qualification of Survivor

A surviving spouse or unmarried minor children is entitled to a pension upon the death of a member while in service or in retirement. Survivor's pensions are conditioned upon marriage having been in effect at least one year prior to death.

Amount of Pension

The minimum survivor's pension upon death of an active or retired member is 50 percent of the deceased member's pension at the date of death. If the surviving spouse is under age 50, and no unmarried minor children under age 18 survive, payment of the survivor's pension is deferred until age 50.

Annual Increases in Pension

Survivor's pensions are subject to annual increases of 3.0 percent per year based on the current amount of pension starting the later of when the member would have attained age 61 and receipt of one year's pension payments.

Death Benefits

Amount and Duration of Payment

Upon the death of a member in service, a refund equal to the total contributions less contributions for survivor's pensions is payable without interest to a designated beneficiary or the estate of the member. The death benefit payable is the lesser of \$10,000 and salary earned for the most recent six months.

Upon death of a member after retirement, the death benefit consists of the excess, if any, of the total contributions over the total pension payments paid to the member or his/her beneficiary. Furthermore, the death benefit is the lesser of \$10,000 and the most recent salary earned for a six-month period less 20% of the death benefit for each year that the member has been on pension, to a minimum of \$5,000.

Non-Duty Disability Benefits

Qualification and Amount of Payment

A disability retirement pension is payable in the event of total or permanent disability with 10 or more years of service, irrespective of age. The benefit is the unreduced service retirement pension. However, if the participant has 20 or more and less than 25 years of service and is under age 55, the benefit is reduced by $\frac{1}{2}$ of 1.0 percent for each month that the age of the member is below age 55 down to a minimum age of 50. If total service is 20 years or more and the member has attained age 55, or after 25 years of service, regardless of age, the retirement pension is payable without reduction.



Summary of Plan Provisions (as of June 30, 2021)

Annual Increases in Annuity

Postretirement increases of 3.0 percent of the current pension (i.e., increases are compounded) are granted to members effective each January 1, occurring on or after the first anniversary of the pension or the 61st birthday, whichever is later.

Duty Disability Benefits

Qualification and Amount of Payment

A disability retirement pension is payable in the event of total or permanent disability from an injury that occurred while working. The disability benefit provided is 75 percent of final average salary until attainment of age 65. At age 65, the disabled retiree shall receive a service retirement pension, which includes service earned while disabled.

Annual Increases in Annuity

Postretirement increases of 3.0 percent of the current pension (i.e., increases are compounded) are granted to members effective each January 1, occurring on or after the first anniversary of the pension or the 61st birthday, whichever is later.

Refunds

Upon termination of employment, a member may obtain a refund of his/her total contributions and those contributions made on his/her behalf, without interest.

A member who is unmarried at the date of retirement is entitled to a refund of the full amount contributed for the survivor's pension, without interest.

Reversionary Pension

A member can provide a reversionary pension for a surviving beneficiary by having his/her current pension reduced. If the beneficiary survives the date of the member's retirement, but does not survive the retired member, the member's pension shall be restored to the full amount of pension in place prior to choosing the reversionary pension.

Health Insurance Subsidy

The board may pay each recipient of a retirement, disability or survivor's pension an amount to be determined by the board, which shall represent partial reimbursement for the cost of the recipient's health insurance coverage, with the total amount of payment not to exceed \$65,000,000, or 75% of the total cost of health insurance coverage in any year.



Summary of Plan Provisions (as of June 30, 2021)

Retirement Systems Reciprocal Act

The Fund complies with the Retirement Systems Reciprocal Act (Chapter 40 Act 5 Article 20 of the Illinois Compiled Statutes) to provide reciprocal benefits if a member has service credit for other public employment in Illinois.

Provisions Applicable to Members Hired on or after January 1, 2011, as a result of Public Act 96-0889

Final Average Compensation

Based on last eight years of service and may not exceed \$106,800, as automatically increased by the lesser of 3 percent or one-half of the annual increase in the consumer price index-u during the preceding 12-month calendar year.

Retirement Eligibility

Normal retirement – 67 years old with 10 years of service.

Early Retirement – 62 years old with 10 years of service with a 6.0 percent per year reduction in benefit for each year age is under 67.

Annual Increases in Annuity

Annual increases begin at the later of the first anniversary of retirement or age 67. The annual increases are equal to the lesser of 3.0 percent or one-half of the annual increase in the consumer price index-u during the preceding 12-month calendar year and are not compounded.

Survivor Benefits

Benefit equal to 66.67 percent of the earned retirement benefit at death. Survivor benefits are increased by the lesser of 3.0 percent or one-half of the annual increase in the consumer price index-u during the preceding 12-month calendar year and are not compounded.



Summary of Plan Provisions (as of June 30, 2021)

Salary and COLA Development for Members Hired on or after January 1, 2011

Year Ending	CPI-U	1/2 CPI-U	COLA	Maximum Annual Pensionable Earnings
2011			3.00%	\$106,800.00
2012	3.90%	1.95%	1.95%	\$108,882.60
2013	2.00%	1.00%	1.00%	\$109,971.43
2014	1.20%	0.60%	0.60%	\$110,631.26
2015	1.70%	0.85%	0.85%	\$111,571.63
2016	0.00%	0.00%	0.00%	\$111,571.63
2017	1.50%	0.75%	0.75%	\$112,408.42
2018	2.20%	1.10%	1.10%	\$113,644.91
2019	2.30%	1.15%	1.15%	\$114,951.83
2020	1.70%	0.85%	0.85%	\$115,928.92
2021	1.40%	0.70%	0.70%	\$116,740.42

SECTION I

GLOSSARY OF TERMS

Glossary of Terms

<i>Actuarial Accrued Liability (“AAL”)</i>	The difference between the Actuarial Present Value of Future Benefits, and the Actuarial Present Value of Future Normal Costs.
<i>Actuarial Assumptions</i>	Assumptions about future plan experience that affect costs or liabilities, such as: mortality, withdrawal, disablement and retirement; future increases in salary; future rates of investment earnings; future investment and administrative expenses; characteristics of members not specified in the data, such as marital status; characteristics of future members; future elections made by members; and other items.
<i>Actuarial Cost Method</i>	A procedure for allocating the Actuarial Present Value of Future Benefits between the Actuarial Present Value of future Normal Costs and the Actuarial Accrued Liability.
<i>Actuarial Equivalent</i>	Of equal Actuarial Present Value, determined as of a given date and based on a given set of Actuarial Assumptions.
<i>Actuarial Present Value (“APV”)</i>	The amount of funds required to provide a payment or series of payments in the future. It is determined by discounting the future payments with an assumed interest rate and with the assumed probability each payment will be made.
<i>Actuarial Present Value of Future Benefits (“APVFB”)</i>	The Actuarial Present Value of amounts which are expected to be paid at various future times to active members, retired members, beneficiaries receiving benefits and inactive, nonretired members 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 provide sufficient assets to pay all projected benefits and expenses when due.
<i>Actuarial Valuation</i>	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 No. 67, such as the Funded Ratio and the Actuarially Determined Contribution (“ADC”).
<i>Actuarial Value of Assets (“AVA”)</i>	The value of the assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets or a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio or contribution requirement.

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<i>Actuarially Determined Contribution (“ADC”)</i>	The employer’s periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation. The ADC consists of the Employer Normal Cost and Amortization Payment.
<i>Amortization Method</i>	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 rate at which total covered payroll of all active members is assumed to increase.
<i>Amortization Payment</i>	That portion of the plan contribution or ADC which is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
<i>Amortization Period</i>	The period used in calculating the Amortization Payment.
<i>Closed Amortization Period</i>	A specific number of years that is reduced by one each year, and 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.
<i>Employer Normal Cost</i>	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
<i>Equivalent Single Amortization Period</i>	For plans that do not establish separate amortization bases (separate components of the UAAL), this is the same as the Amortization Period. For plans that do establish separate amortization bases, this is the period over which the UAAL would be amortized if all amortization bases were combined upon the current UAAL payment.
<i>Experience Gain/Loss</i>	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two actuarial valuations. To the extent that actual experience differs from that assumed, Unfunded Actuarial Accrued Liabilities emerge which may be larger or smaller than projected. Gains are due to favorable experience; e.g., the assets earn more than projected, salaries do not increase as fast as assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, losses are the result of unfavorable experience; i.e., actual results that produce Unfunded Actuarial Accrued Liabilities which are larger than projected.

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<i>Funded Ratio</i>	The ratio of the Actuarial Value of Assets to the Actuarial Accrued Liability.
<i>GASB</i>	Governmental Accounting Standards Board.
<i>GASB Statement No. 67 and GASB Statement No. 68</i>	These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. GASB Statement No. 68, which replaced GASB Statement No. 27 effective with the fiscal year ending June 30, 2015, sets the accounting rules for the employers that sponsor or contribute to public retirement systems. GASB Statement No. 67, which replaced GASB Statement No. 25 effective with fiscal year ending June 30, 2014, sets the rules for the systems themselves.
<i>Normal Cost</i>	The annual cost assigned, under the Actuarial Cost Method, to the current plan year.
<i>Open Amortization Period</i>	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. In other words, 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.
<i>Unfunded Actuarial Accrued Liability</i>	The difference between the Actuarial Accrued Liability and Actuarial Value of Assets.
<i>Valuation Date</i>	The date as of which the Actuarial Present Value of Future Benefits are determined. The benefits expected to be paid in the future are discounted to this date.

SECTION J

ADDITIONAL PROJECTION DETAILS

Table 21

Additional Projection Details — Actuarial Accrued Liability (\$ in Millions)

Fiscal Year Ending	Current Inactives		Actives			Grand Totals		
	Retirees & Beneficiaries	Deferreds	Tier 1	Current Tier 2	Future Tier 2	Current Retirees, Beneficiaries & Deferreds	Actives	Total
2021	\$17,555.52	\$572.34	\$6,688.30	\$301.83	\$0.00	\$18,127.86	\$6,990.13	\$25,117.99
2022	17,127.66	588.42	7,470.37	364.20	0.00	17,716.08	7,834.58	25,550.66
2023	16,667.74	604.99	8,277.78	429.87	9.03	17,272.73	8,716.68	25,989.41
2024	16,177.13	621.86	9,108.78	500.93	25.95	16,798.99	9,635.66	26,434.65
2025	15,657.36	638.81	9,959.93	578.97	50.24	16,296.18	10,589.15	26,885.32
2026	15,110.20	655.77	10,827.32	664.62	81.49	15,765.97	11,573.44	27,339.41
2027	14,537.55	672.64	11,707.34	759.50	120.44	15,210.20	12,587.29	27,797.48
2028	13,941.60	689.25	12,595.57	864.74	167.12	14,630.85	13,627.43	28,258.28
2029	13,324.77	705.37	13,487.31	980.77	222.15	14,030.14	14,690.23	28,720.37
2030	12,689.72	720.90	14,377.43	1,107.57	286.85	13,410.62	15,771.86	29,182.48
2031	12,039.40	735.45	15,260.59	1,243.95	362.48	12,774.85	16,867.01	29,641.86
2032	11,377.04	767.58	16,131.11	1,389.66	452.24	12,144.62	17,973.00	30,117.62
2033	10,706.11	799.09	16,982.59	1,545.28	557.30	11,505.19	19,085.18	30,590.37
2034	10,030.32	829.95	17,808.22	1,711.33	678.92	10,860.27	20,198.47	31,058.74
2035	9,353.65	859.87	18,600.81	1,888.36	818.39	10,213.51	21,307.57	31,521.08
2036	8,680.17	888.71	19,353.30	2,076.88	977.12	9,568.88	22,407.30	31,976.18
2037	8,014.13	916.27	20,058.39	2,277.27	1,156.55	8,930.40	23,492.20	32,422.61
2038	7,359.78	942.48	20,708.51	2,489.93	1,358.26	8,302.26	24,556.71	32,858.96
2039	6,721.34	966.71	21,296.33	2,715.00	1,583.96	7,688.06	25,595.29	33,283.34
2040	6,102.90	988.15	21,814.44	2,952.73	1,835.42	7,091.05	26,602.59	33,693.64
2041	5,508.30	1,006.74	22,255.24	3,203.21	2,114.46	6,515.04	27,572.91	34,087.95
2042	4,941.01	1,022.19	22,611.78	3,466.00	2,423.06	5,963.20	28,500.84	34,464.04
2043	4,404.08	1,034.44	22,879.83	3,740.60	2,763.21	5,438.52	29,383.64	34,822.16
2044	3,900.02	1,042.88	23,057.06	4,025.93	3,136.91	4,942.91	30,219.90	35,162.80
2045	3,430.79	1,047.49	23,142.90	4,320.75	3,546.25	4,478.28	31,009.91	35,488.19
2046	2,997.71	1,048.42	23,139.54	4,622.83	3,993.27	4,046.13	31,755.64	35,801.77
2047	2,601.49	1,044.80	23,050.50	4,929.20	4,480.01	3,646.29	32,459.70	36,105.99
2048	2,242.23	1,037.62	22,880.55	5,237.20	5,008.45	3,279.85	33,126.20	36,406.05
2049	1,919.41	1,027.18	22,635.31	5,543.15	5,580.50	2,946.59	33,758.96	36,705.55
2050	1,631.97	1,013.91	22,320.81	5,841.06	6,198.10	2,645.89	34,359.97	37,005.86
2051	1,378.37	998.18	21,943.36	6,123.96	6,863.24	2,376.56	34,930.55	37,307.11
2052	1,156.66	980.41	21,508.14	6,385.45	7,577.75	2,137.07	35,471.34	37,608.41
2053	964.57	960.57	21,019.18	6,621.19	8,343.25	1,925.14	35,983.63	37,908.77
2054	799.64	938.72	20,479.96	6,827.31	9,161.03	1,738.35	36,468.31	38,206.66
2055	659.27	914.88	19,893.90	6,998.38	10,031.96	1,574.15	36,924.23	38,498.38
2056	540.85	889.07	19,264.42	7,129.77	10,956.56	1,429.92	37,350.75	38,780.67
2057	441.79	861.39	18,595.03	7,219.26	11,934.79	1,303.18	37,749.08	39,052.26
2058	359.61	831.93	17,889.28	7,267.08	12,966.14	1,191.54	38,122.51	39,314.05
2059	291.97	800.79	17,150.96	7,275.22	14,049.46	1,092.77	38,475.63	39,568.40



Table 22

Additional Projection Details — Present Value of Future Benefits (\$ in Millions)

Fiscal Year Ending	Current Inactives		Actives			Grand Totals		
	Retirees & Beneficiaries	Deferreds	Tier 1	Current Tier 2	Future Tier 2	Current Retirees, Beneficiaries & Deferreds	Actives	Total
2021	\$17,555.52	\$572.34	\$10,537.28	\$1,410.81	\$0.00	\$18,127.86	\$11,948.09	\$30,075.94
2022	17,127.66	588.42	11,186.56	1,471.89	115.74	17,716.08	12,774.19	30,490.27
2023	16,667.74	604.99	11,853.13	1,538.57	247.35	17,272.73	13,639.05	30,911.78
2024	16,177.13	621.86	12,535.30	1,611.64	390.05	16,798.99	14,536.99	31,335.98
2025	15,657.36	638.81	13,230.30	1,691.88	542.59	16,296.18	15,464.78	31,760.95
2026	15,110.20	655.77	13,934.93	1,779.28	706.62	15,765.97	16,420.82	32,186.79
2027	14,537.55	672.64	14,646.19	1,874.95	881.38	15,210.20	17,402.52	32,612.72
2028	13,941.60	689.25	15,360.53	1,979.56	1,068.19	14,630.85	18,408.28	33,039.13
2029	13,324.77	705.37	16,074.34	2,093.18	1,268.34	14,030.14	19,435.86	33,466.00
2030	12,689.72	720.90	16,783.52	2,215.48	1,483.26	13,410.62	20,482.26	33,892.88
2031	12,039.40	735.45	17,483.76	2,345.00	1,713.59	12,774.85	21,542.35	34,317.21
2032	11,377.04	767.58	18,170.39	2,481.26	1,962.64	12,144.62	22,614.29	34,758.91
2033	10,706.11	799.09	18,838.22	2,624.54	2,232.62	11,505.19	23,695.38	35,200.57
2034	10,030.32	829.95	19,481.82	2,775.14	2,524.34	10,860.27	24,781.29	35,641.56
2035	9,353.65	859.87	20,095.53	2,933.36	2,838.91	10,213.51	25,867.80	36,081.31
2036	8,680.17	888.71	20,673.81	3,099.47	3,177.62	9,568.88	26,950.90	36,519.78
2037	8,014.13	916.27	21,211.51	3,274.08	3,541.94	8,930.40	28,027.53	36,957.93
2038	7,359.78	942.48	21,702.64	3,457.46	3,933.23	8,302.26	29,093.33	37,395.58
2039	6,721.34	966.71	22,141.29	3,649.70	4,352.99	7,688.06	30,143.98	37,832.04
2040	6,102.90	988.15	22,521.43	3,850.99	4,802.18	7,091.05	31,174.60	38,265.65
2041	5,508.30	1,006.74	22,837.05	4,061.35	5,283.03	6,515.04	32,181.43	38,696.47
2042	4,941.01	1,022.19	23,082.56	4,280.46	5,796.44	5,963.20	33,159.46	39,122.67
2043	4,404.08	1,034.44	23,254.23	4,507.93	6,343.24	5,438.52	34,105.40	39,543.92
2044	3,900.02	1,042.88	23,349.81	4,742.86	6,925.19	4,942.91	35,017.87	39,960.77
2045	3,430.79	1,047.49	23,368.20	4,984.36	7,542.41	4,478.28	35,894.97	40,373.25
2046	2,997.71	1,048.42	23,310.30	5,230.69	8,196.45	4,046.13	36,737.43	40,783.56
2047	2,601.49	1,044.80	23,178.02	5,479.56	8,887.70	3,646.29	37,545.29	41,191.58
2048	2,242.23	1,037.62	22,974.40	5,728.92	9,616.99	3,279.85	38,320.30	41,600.15
2049	1,919.41	1,027.18	22,703.35	5,975.78	10,386.34	2,946.59	39,065.46	42,012.05
2050	1,631.97	1,013.91	22,369.34	6,215.44	11,198.75	2,645.89	39,783.53	42,429.42
2051	1,378.37	998.18	21,977.33	6,442.48	12,055.61	2,376.56	40,475.42	42,851.98
2052	1,156.66	980.41	21,531.44	6,651.82	12,958.15	2,137.07	41,141.42	43,278.49
2053	964.57	960.57	21,034.81	6,840.05	13,906.76	1,925.14	41,781.63	43,706.77
2054	799.64	938.72	20,490.20	7,003.82	14,901.81	1,738.35	42,395.83	44,134.18
2055	659.27	914.88	19,900.41	7,137.99	15,943.96	1,574.15	42,982.36	44,556.51
2056	540.85	889.07	19,268.43	7,238.00	17,033.05	1,429.92	43,539.48	44,969.40
2057	441.79	861.39	18,597.39	7,301.46	18,169.33	1,303.18	44,068.18	45,371.36
2058	359.61	831.93	17,890.61	7,328.33	19,352.03	1,191.54	44,570.96	45,762.50
2059	291.97	800.79	17,151.65	7,320.16	20,580.27	1,092.77	45,052.07	46,144.84



Table 23
Additional Projection Details — Benefit Payments Including
Administrative Expenses and Health Insurance Subsidy
(\$ in Millions)

Fiscal Year Ending	Current Inactives		Actives			Grand Totals		
	Retirees & Beneficiaries	Deferreds	Tier 1	Current Tier 2	Future Tier 2	Current Retirees, Beneficiaries & Deferreds	Actives	Total
2022	\$1,520.34	\$20.46	\$78.18	\$51.02	\$0.00	\$1,540.80	\$129.20	\$1,670.00
2023	1,524.46	21.01	100.22	47.83	7.16	1,545.46	155.21	1,700.68
2024	1,525.22	21.75	125.24	44.72	13.93	1,546.97	183.89	1,730.87
2025	1,522.57	22.75	153.98	41.51	20.91	1,545.32	216.40	1,761.72
2026	1,516.39	23.80	186.66	38.99	28.23	1,540.19	253.87	1,794.06
2027	1,506.61	24.96	222.87	35.95	35.27	1,531.57	294.08	1,825.65
2028	1,493.13	26.27	262.95	32.89	42.75	1,519.41	338.59	1,858.00
2029	1,475.83	27.79	306.73	30.41	50.37	1,503.62	387.52	1,891.13
2030	1,454.63	29.38	354.43	28.87	57.69	1,484.01	440.98	1,924.99
2031	1,429.42	31.31	406.02	29.30	65.02	1,460.73	500.35	1,961.08
2032	1,400.14	15.19	461.58	30.69	70.45	1,415.32	562.72	1,978.04
2033	1,366.72	17.81	521.31	32.23	76.12	1,384.54	629.66	2,014.20
2034	1,329.16	20.43	585.13	33.92	82.23	1,349.59	701.27	2,050.86
2035	1,287.46	23.28	652.90	35.75	88.84	1,310.75	777.50	2,088.24
2036	1,241.74	26.21	724.19	37.79	95.96	1,267.95	857.94	2,125.89
2037	1,192.12	29.26	798.24	39.71	102.59	1,221.38	940.54	2,161.93
2038	1,138.84	32.32	875.58	41.88	109.59	1,171.16	1,027.05	2,198.21
2039	1,082.20	35.88	955.72	44.49	116.98	1,118.08	1,117.19	2,235.27
2040	1,022.61	40.12	1,038.46	47.43	124.78	1,062.73	1,210.67	2,273.40
2041	960.57	44.22	1,123.39	50.90	133.00	1,004.79	1,307.29	2,312.08
2042	896.64	48.43	1,209.70	55.24	141.72	945.08	1,406.66	2,351.74
2043	831.50	52.51	1,295.29	60.48	150.89	884.01	1,506.66	2,390.68
2044	765.82	56.98	1,378.51	67.09	160.52	822.80	1,606.12	2,428.92
2045	700.33	61.21	1,458.14	75.02	170.68	761.55	1,703.83	2,465.38
2046	635.75	65.08	1,532.18	85.00	181.34	700.82	1,798.52	2,499.34
2047	572.75	69.55	1,599.69	97.47	192.62	642.29	1,889.78	2,532.07
2048	511.98	72.77	1,659.76	112.07	204.56	584.75	1,976.39	2,561.13
2049	454.04	75.47	1,711.66	129.57	217.26	529.51	2,058.50	2,588.01
2050	399.42	77.55	1,755.12	151.44	230.91	476.97	2,137.47	2,614.44
2051	348.53	79.10	1,789.90	178.04	245.77	427.63	2,213.71	2,641.34
2052	301.66	80.09	1,817.13	208.74	262.01	381.75	2,287.88	2,669.63
2053	258.99	80.98	1,837.98	241.62	279.87	339.96	2,359.47	2,699.43
2054	220.57	81.68	1,853.03	276.43	299.61	302.25	2,429.07	2,731.32
2055	186.38	82.23	1,862.37	314.74	321.52	268.61	2,498.63	2,767.24
2056	156.27	82.63	1,866.02	355.64	345.96	238.91	2,567.62	2,806.53
2057	130.05	82.82	1,863.99	396.79	373.32	212.87	2,634.10	2,846.97
2058	107.46	82.80	1,856.32	435.72	404.00	190.26	2,696.05	2,886.31
2059	88.19	82.57	1,842.95	470.93	438.48	170.76	2,752.36	2,923.12



Table 24

Additional Projection Details — Active Population, Covered Payroll, Employee Contributions and Normal Costs (\$ in Millions)

Fiscal Year Ending	Tier 1 Active Members				Current Tier 2 Active Members				Future Tier 2 Active Members			
	Population	Covered Payroll	Employee Contributions	Normal Cost	Population	Covered Payroll	Employee Contributions	Normal Cost	Population	Covered Payroll	Employee Contributions	Normal Cost
2021	17,815	\$1,609.89	\$144.89	\$414.74	13,426	\$787.86	\$70.91	\$92.45	0	\$0.00	\$0.00	\$0.00
2022	16,675	1,570.93	141.38	412.08	11,867	746.24	67.16	88.52	2,699	140.74	12.67	15.91
2023	15,688	1,535.30	138.18	409.11	10,782	720.04	64.80	86.49	4,771	259.12	23.32	29.76
2024	14,765	1,498.63	134.88	405.02	9,937	702.37	63.21	85.59	6,540	369.61	33.26	42.81
2025	13,891	1,459.58	131.36	399.83	9,268	691.13	62.20	85.52	8,082	474.98	42.75	55.35
2026	13,046	1,418.41	127.66	393.64	8,716	683.99	61.56	86.03	9,478	578.74	52.09	67.88
2027	12,244	1,374.87	123.74	386.26	8,256	680.31	61.23	87.02	10,741	681.06	61.30	80.40
2028	11,459	1,327.73	119.50	377.50	7,871	679.44	61.15	88.38	11,910	783.70	70.53	93.17
2029	10,698	1,277.84	115.01	367.46	7,532	680.04	61.20	89.97	13,011	887.89	79.91	106.39
2030	9,953	1,224.92	110.24	356.24	7,224	681.58	61.34	91.69	14,064	994.91	89.54	120.24
2031	9,231	1,169.80	105.28	343.92	6,938	683.53	61.52	93.53	15,071	1,104.82	99.43	134.60
2032	8,525	1,111.98	100.08	330.39	6,691	685.80	61.72	95.50	16,025	1,217.05	109.53	149.44
2033	7,834	1,051.59	94.64	315.51	6,456	687.14	61.84	97.49	16,950	1,333.45	120.01	164.98
2034	7,160	988.42	88.96	299.28	6,234	687.33	61.86	99.50	17,847	1,453.95	130.86	181.23
2035	6,504	923.08	83.08	281.78	6,024	686.31	61.77	101.53	18,713	1,578.47	142.06	198.21
2036	5,866	855.64	77.01	262.50	5,826	683.75	61.54	103.08	19,549	1,706.95	153.63	214.91
2037	5,249	786.65	70.80	242.17	5,633	679.21	61.13	104.52	20,359	1,839.42	165.55	232.21
2038	4,655	716.11	64.45	220.99	5,444	672.76	60.55	105.75	21,142	1,975.62	177.81	250.13
2039	4,087	645.23	58.07	199.16	5,253	663.92	59.75	106.78	21,901	2,115.74	190.42	268.68
2040	3,546	574.34	51.69	176.53	5,067	654.01	58.86	107.64	22,628	2,258.86	203.30	287.79
2041	3,029	502.49	45.22	153.43	4,878	642.12	57.79	108.13	23,335	2,405.82	216.52	307.57
2042	2,548	432.79	38.95	130.83	4,684	628.29	56.55	108.27	24,009	2,555.43	229.99	327.87
2043	2,111	366.53	32.99	109.16	4,489	613.05	55.17	107.97	24,641	2,706.69	243.60	348.59
2044	1,716	304.42	27.40	89.07	4,286	595.45	53.59	107.12	25,239	2,859.87	257.39	369.75
2045	1,373	248.78	22.39	71.26	4,078	576.06	51.85	105.58	25,790	3,013.01	271.17	391.13
2046	1,080	199.92	17.99	55.96	3,854	553.13	49.78	103.17	26,307	3,166.31	284.97	412.76
2047	838	158.51	14.27	43.24	3,621	527.60	47.48	100.06	26,782	3,318.28	298.65	434.44
2048	640	123.81	11.14	32.89	3,383	500.17	45.02	96.17	27,218	3,468.28	312.14	456.12
2049	482	95.52	8.60	24.68	3,129	469.14	42.22	90.98	27,630	3,617.15	325.54	477.88
2050	359	72.68	6.54	18.26	2,841	431.75	38.86	84.27	28,041	3,766.58	338.99	499.90
2051	262	54.49	4.90	13.29	2,533	389.94	35.10	76.41	28,445	3,915.83	352.42	522.09
2052	188	40.12	3.61	9.49	2,216	345.27	31.07	67.86	28,836	4,064.42	365.80	544.36
2053	132	28.95	2.61	6.63	1,906	300.53	27.05	59.13	29,202	4,211.22	379.01	566.53
2054	91	20.46	1.84	4.53	1,612	257.11	23.14	50.48	29,538	4,355.34	391.98	588.45
2055	61	14.07	1.27	3.03	1,336	215.54	19.40	42.17	29,844	4,496.72	404.70	610.04
2056	40	9.49	0.85	1.98	1,085	177.22	15.95	34.43	30,116	4,634.42	417.10	631.12
2057	25	6.18	0.56	1.24	859	142.01	12.78	27.35	30,356	4,768.55	429.17	651.67
2058	15	3.83	0.34	0.75	663	110.91	9.98	21.09	30,563	4,898.49	440.86	671.54
2059	9	2.27	0.20	0.43	495	83.97	7.56	15.76	30,737	5,024.00	452.16	690.65

Employee contributions and normal cost are for the following year.

Normal cost includes administrative expenses and the health insurance subsidy of \$65 million annually.

Covered payroll is capped for members hired after December 31, 2010, as defined by Public Act 96-0889.

Fiscal year ending June 30, 2021 includes 26 members expected to be hired to replace retirements and terminations that occurred in June 2021.



APPENDIX 1: STRESS TESTING SCENARIOS



May 4, 2021

Board of Trustees
Public School Teachers' Pension and Retirement Fund of Chicago
203 North LaSalle Street, Suite 2600
Chicago, Illinois 60601

Re: Stress Testing Scenarios Based on Actuarial Valuation Results as of June 30, 2020

Dear Members of the Board:

At your request, we have performed stress testing of the required employer contributions and funded ratio for the Public School Teachers' Pension and Retirement Fund of Chicago (commonly known as the Chicago Teachers' Pension Fund, "CTPF" or "Fund") based on the results of the June 30, 2020 actuarial valuation. This stress testing was performed to illustrate the potential impact on total required employer contributions and the CTPF funded ratio in the event there is a significant and/or sustained market downturn or significant volatility in investment returns or volatility in future active population.

GRS has prepared this analysis exclusively for the Trustees of the Chicago Teachers' Pension Fund; GRS is not responsible for reliance upon this report by any other party. This report may be provided to parties other than the CTPF only in its entirety and only with the permission of the CTPF and the Board.

Description of Investment Return Stress Testing Scenarios

GRS performed six alternative investment return stress testing scenarios. A summary of the results of these six scenarios can be found in Exhibit I(A) and the details of the results of these scenarios can be found in Exhibits II through VII. The alternative investment return stress testing scenarios are based on the Fund earning (on average) four different rates of investment return through fiscal year 2059. The four different rates of average investment returns are 1) earning the actuarial valuation assumption of 6.75 percent; 2) earning the 25th percentile return (4.12 percent) from the GRS 2020 Investment Return Assumption Review; 3) earning the 40th percentile return (5.31 percent) from the GRS 2020 Investment Return Assumption Review; and 4) earning a static return of 0.00 percent (as requested by Senate Pension Chairman Martwick's proposal in February 2021). The percentile returns are the averages from the 13 investment consultants with shorter term horizons from the GRS 2020 Investment Return Assumption Review dated September 10, 2020.

In order to demonstrate the risk and volatility of the returns, a static return scenario and a volatile return scenario were completed for the rates of return of 6.75 percent, 4.12 percent and 5.31 percent. We provided results assuming volatile returns with a geometric average equal to the actuarial valuation assumption, the 25th percentile return (75 percent probability that the average return will be higher than the 25th percentile return) and the 40th percentile return (60 percent probability that the average return will be higher than the 40th percentile return). Please note that each volatile return scenario represents one possible trial that generates the targeted average geometric return, and that another equally likely trial that produces the same targeted average geometric return could produce significantly different contribution and funded ratio patterns. Following is a summary table illustrating the alternate investment return stress testing scenarios:

Scenario	Returns in FY 2021 through 2059	Basis for Returns
Baseline	Static return of 6.75%	June 30, 2020 actuarial valuation results
1	Volatile returns, 39-year average of 6.75% from 2021 through 2059	Valuation assumption
2	Static return of 4.12%	25 th percentile return
3	Volatile returns, 39-year average of 4.12% from 2021 through 2059	25 th percentile return
4	Static return of 5.31%	40 th percentile return
5	Volatile returns, 39-year average of 5.31% from 2021 through 2059	40 th percentile return
6	Static return of 0.00%	Senate Pension Chairman Martwick's proposal in February 2021

Description of Future Active Population Stress Testing Scenarios

In addition to the six investment return stress testing scenarios, GRS performed stress testing scenarios based on variations in the future active population. A summary of these scenarios can be found in Exhibit I(B) and the details of the results of these scenarios can be found in Exhibits VIII and IX. Based on information reviewed during the most recent experience study, there was an average decrease in the CTPF active member population between 2007 and 2016 of approximately 1.2 percent per year. There was an additional decrease between 2016 and 2017 and increases between 2017 to 2018, 2018 to 2019, and 2019 to 2020. To demonstrate the risk and volatility associated with changes in the number of future active CTPF members, the table on the following page illustrates the future active population stress testing scenarios that we examined.



Scenario	Population Growth Assumption	Returns in FY 2021 through 2059
7	1.0 percent reduction in the number of active members per year for the next 10 years, then remains constant	Static return of 6.75%
8	1.0 percent increase in the number of active members per year for the next 10 years, then remains constant	Static return of 6.75%

The future active population used in Scenarios 7 and 8 can be found in Exhibit I(B).

In each scenario, the discount rate used to determine liabilities remains at 6.75 percent, and average future uncapped salary growth or wage inflation remains at 2.75 percent per year. The future active population remains constant at 30,197 (30,091 active members as of June 30, 2020 plus 106 members assumed to be hired after June 30 to replace recent retirees) in the investment return stress testing scenarios.

The following graphs are included in the analysis:

- Exhibit X: Projected Annual Rates of Return Used in the Stress Testing Scenarios
- Exhibit XI: Projected Cumulative Rates of Return Used in the Volatile Stress Testing Scenarios
- Exhibit XII: Projected Total Required Employer Contributions under the Stress Testing Scenarios
- Exhibit XIII: Projected Funded Ratio under the Stress Testing Scenarios

GRS believes that these scenarios provide a reasonable illustration of the potential future volatility of investment returns, population and the resulting employer contribution requirements based on the current actuarial assumptions and methods. These scenarios are not intended to represent the full range of all possible outcomes. Annual returns will likely be significantly different from the returns shown in Exhibit I(A) and the 39-year geometric average of actual returns may be either higher or lower than the assumption of 6.75 percent.

Analysis of Stress Testing Scenario Results

Under the projected results from the actuarial valuation as of June 30, 2020, in which all future actuarial assumptions are assumed to be realized, the statutory contribution dollar amount increases at the rate of projected payroll growth. There is an increase in the funded ratio from 46.7 percent as of June 30, 2020, to 90 percent as of June 30, 2059, with a significant portion of the increase occurring after 2049. The funded ratio increases from about 46.7 percent to 62.0 percent between 2020 and 2049, and then to 90.0 percent by 2059.



The following table presents a summary of the combined State and Board of Education contributions (“total required employer contributions”), and the present value of the total required employer contributions during the fiscal years 2021 through 2059 under the alternative stress testing scenarios. In addition, we have summarized the maximum and minimum percentage change in the annual total required employer contribution and the funded ratio for each scenario. The second table compares the results of the static and volatile return and the increasing and decreasing population scenarios.

	Contributions* FY 2021-2059 (\$ in Millions)		Annual Total Required Contribution \$ Change		Minimum Funded Ratio		Annual Funded Ratio (AVA) Change	
	Total	PV	Maximum	Maximum	(AVA)	(MVA)	Maximum	Maximum
	Contributions	Contributions ¹	Increase	Decrease			Increase	Decrease
Baseline (6.75% Static)	\$54,031.504	\$16,758.764	6.64%	1.81%	45.45%	45.29%	3.88%	-0.50%
Scenario 1 (6.75% Volatile)	58,103.577	18,218.969	31.64%	-85.63%	34.35%	31.91%	9.05%	-5.19%
Scenario 2 (4.12% Static)	76,993.212	20,690.078	14.70%	3.13%	35.69%	34.30%	8.63%	-1.08%
Scenario 3 (4.12% Volatile)	70,930.972	20,627.474	63.15%	-41.14%	26.85%	23.66%	8.83%	-1.96%
Scenario 4 (5.31% Static)	68,208.520	19,145.870	11.39%	2.74%	41.08%	40.19%	6.87%	-0.80%
Scenario 5 (5.31% Volatile)	60,032.431	15,521.300	53.82%	-26.64%	41.28%	35.99%	7.28%	-8.17%
Scenario 6 (0.00% Static)	95,768.873	24,209.648	20.76%	3.45%	22.34%	20.32%	12.24%	-2.51%
Scenario 7 (1% Population Decrease)	53,250.112	16,772.874	9.27%	1.10%	45.65%	45.29%	3.95%	-0.51%
Scenario 8 (1% Population Increase)	54,777.380	16,742.664	7.34%	-4.22%	45.01%	45.01%	3.81%	-0.50%

	Total Contributions* FY 2021-2059 (\$ in Millions)			PV Contributions* FY 2021-2059 (\$ in Millions)		
	Static/ Decrease	Volatile/ Increase	Difference	Static/ Decrease	Volatile/ Increase	Difference
	Baseline	Scenario	Difference	Baseline	Scenario	Difference
Baseline/Scenario 1 (6.75%)	\$54,031.504	\$58,103.577	\$4,072.073	\$16,758.764	\$18,218.969	\$1,460.205
Scenario 2/Scenario 3 (4.12%)	76,993.212	70,930.972	-6,062.240	20,690.078	20,627.474	-62.604
Scenario 4/Scenario 5 (5.31%)	68,208.520	60,032.431	-8,176.089	19,145.870	15,521.300	-3,624.570
Scenario 6 (0.00%)	95,768.873	N/A	N/A	24,209.648	N/A	N/A
Scenario 7/Scenario 8 (Decrease/Increase)	53,250.112	54,777.380	1,527.268	16,772.874	16,742.664	-30.210
Scenario 2 (4.12% Static)	\$54,031.504	\$76,993.212	\$22,961.708	\$16,758.764	\$20,690.078	\$3,931.314
Scenario 3 (4.12% Volatile)	54,031.504	70,930.972	16,899.468	16,758.764	20,627.474	3,868.710
Scenario 4 (5.31% Static)	54,031.504	68,208.520	14,177.016	16,758.764	19,145.870	2,387.106
Scenario 5 (5.31% Volatile)	54,031.504	60,032.431	6,000.927	16,758.764	15,521.300	-1,237.464
Scenario 6 (0.00% Static)	54,031.504	95,768.873	41,737.369	16,758.764	24,209.648	7,450.884
Scenario 7 (1% Population Decrease)	54,031.504	53,250.112	-781.392	16,758.764	16,772.874	14.110
Scenario 8 (1% Population Increase)	54,031.504	54,777.380	745.876	16,758.764	16,742.664	-16.100

* Combined State and Board of Education contributions.

¹ In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year.

Based on the scenarios that are summarized above, the total required employer contributions and the present value of the total required employer contributions are dependent on both the annualized investment returns and the pattern of the investment returns. In the scenarios in which the average return is 6.75 percent (Baseline and Scenario 1), the total required employer contributions are approximately \$4.1 billion higher under Scenario 1 compared to the Baseline, with the present value of contributions about \$1.5 billion higher under Scenario 1 based on lower average returns during the earlier years of the projection period. Under Scenarios 2 and 3, in which the average annualized return is 4.12 percent, the volatile returns result in lower total nominal contributions and lower contributions on a present value basis, when compared to the static return results. Similarly, under Scenarios 4 and 5, in which the average annualized return is 5.31 percent, the volatile returns result in lower total nominal



contributions and lower contributions on a present value basis, when compared to the static return results. Under Scenario 6, in which the annual return is 0.00 percent, the total required employer contributions are approximately \$41.7 billion higher compared to the Baseline, with the present value of contributions about \$7.5 billion higher compared to the Baseline.

For the period 2021 through 2059, an average annualized return approximately equal to 5.31 percent would result in lower required employer contributions (on a present value basis) of about \$1 billion (Scenario 5) to higher required employer contributions of about \$2 billion (Scenario 4), when compared to an average annualized return of 6.75 percent. For the same period, an average annualized return approximately equal to 4.12 percent would result in higher required employer contributions (on a present value basis) of about \$4 billion (under Scenarios 2 and 3), when compared to an average annualized return of 6.75 percent.

Because of the volatility and deviation of the returns from the actuarial assumption of 6.75 percent and the fact that the required employer contribution for fiscal year 2059 is determined based on the actuarial valuation results as of June 30, 2057, the funded ratios on both an actuarial value of assets basis and a market value of assets basis do not equal 90 percent in 2059. In Scenarios 2 through 6, the funded ratio is less than 90 percent in 2059 and in Scenario 1, the funded ratio is greater than 90 percent.

Under Scenarios 7 and 8, in which the future active population decreases/increases 1.00 percent per year for 10 years then remains constant through 2059, the decreasing population scenario results in slightly lower total nominal contributions and higher contributions on a present value basis, when compared to the Baseline results (with the same returns). Incorporating an assumption of a decreasing active population is projected to result in an increase in the required employer contribution rate of over 3.00 percent of pay. In addition, the required employer contribution (as a dollar amount) is projected to be higher than the baseline through the fiscal year 2030 contribution. A decreasing active population (that is not reflected in the actuarial assumptions) is expected to result in losses due to the Fund receiving lower contributions than expected (based on lower payroll) and a continuously increasing employer rate as a percentage of payroll if the actual payroll is lower than had been projected. The increasing population scenario results in higher total nominal contributions and lower contributions on a present value basis, when compared to the baseline results.

In each scenario, we have assumed that the State and the Board of Education will make the required contribution when due. However, some scenarios result in very high contributions for extended periods of time which may be difficult to afford. We are not able to opine on the sponsor's ability to pay such high contribution requirements.

Due to the volatility of the investment returns, the minimum market value of assets funded ratio during the projection period is less than 30 percent in Scenarios 3 and 6, less than 40 percent in Scenarios 1, 2, and 5, and less than 50 percent in Scenario 4. The analysis does not consider the implication of potential required changes in asset allocation in order to maintain sufficient liquidity to make all required benefit



payments or a change in the rate used to calculate liabilities if there were low expected future investment earnings.

To the best of our knowledge, this actuarial statement is complete and accurate, fairly presents the actuarial position of CTPF as of June 30, 2020 under the alternative stress testing scenarios and has been prepared in accordance with generally accepted actuarial principles and practices, with the Actuarial Standards of Practice issued by the Actuarial Standards Board and with applicable statutes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions, contribution amounts or applicable law. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements in this report.

This letter is part of the CTPF actuarial valuation as of June 30, 2020, and is subject to the same actuarial assumptions and disclosures as used in the presentation and the actuarial valuation report. The stress testing scenarios used future investment returns and active populations as shown in Exhibits I(A) and I(B). All other assumptions and methods were the same as those used in the CTPF actuarial valuation as of June 30, 2020, including the 6.75 percent discount rate used to determine liabilities in all stress testing scenarios.

In each projection scenario, the total required employer contribution in each year has been projected as though an actuarial valuation in each of those years was performed. The market value of assets at each projected valuation is assumed to be based on the rates of investment return and total required employer contributions in the preceding years, according to the Scenario being modeled, and the valuation interest rate (6.75 percent) going forward. At each projected actuarial valuation, an additional 20 percent of the investment gains and losses are recognized in the actuarial value of assets. This iterative process is followed for each projection year through 2059.

Numerous additional assumptions could be varied in stress testing scenarios, such as payroll growth, inflation and other member behavior. The stress testing analysis performed focused on variations in investment return, which is likely one of the most significant stressors on the Fund and population growth. GRS can perform additional stress testing scenarios at the Board's request.

The statutory funding method generates a contribution requirement that is less than a reasonable actuarially determined contribution. Meeting the statutory requirement does not mean that the undersigned agree that adequate actuarial funding has been achieved; we recommend the adherence to a funding policy, such as the Board policy used to calculate the actuarially determined contribution under GASB Statement Nos. 67 and 68, which funds the normal cost of the plan as well as an amortization



Board of Trustees
Public School Teachers' Pension and Retirement Fund of Chicago
May 4, 2021
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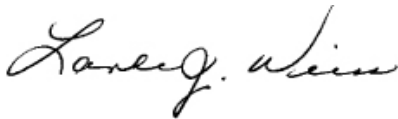
payment that seeks to pay off any unfunded accrued liability over a closed period of 30 years, beginning July 1, 2013.

This report was prepared using our proprietary valuation model and related software which in our professional judgment has the capability to provide results that are consistent with the purposes of the valuation. We performed tests to ensure that the model reasonably represents that which is intended to be modeled. We are relying on the GRS actuaries and Internal Software, Training, and Processes Team who developed and maintain the model.


The signing actuaries are independent of the plan sponsor.

Lance Weiss and Amy Williams are Members of the American Academy of Actuaries ("MAAA") and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

Sincerely,



Lance J. Weiss, EA, MAAA, FCA
Senior Consultant and Team Leader



Amy Williams, ASA, MAAA, FCA
Senior Consultant

LJW/AW:ah
Enclosure

cc: Kristen Brundirks, GRS



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Assumed Investment Returns Used in Stress testing Scenarios
and Total Required Employer Contributions and Funded Ratio
Based on Actuarial Valuation as of June 30, 2020

Table with columns for Year, Baseline, Scenarios 1-8 (Nominal and Geometric returns), Total Required Employer Contributions (\$ in millions), and Funded Ratio (AVA). Rows include data for years 2021-2059 and summary totals for contributions and present value from FY 2021-2030 and FY 2021-2059.

1Nominal one-year rate of return.

2Cumulative average geometric return from 2021 through the current year.

In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year.

Funded ratios lower than 30% are highlighted in red and funded ratios between 30% and 40% are highlighted in yellow.



**Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Assumed Investment Returns and Active Population Used in Stress Testing Scenarios
and Total Required Employer Contributions and Funded Ratio
Based on Actuarial Valuation as of June 30, 2020**

Year	Baseline - Population remains constant at 2020 level	Scenario 7 - Population decreases 1% per year for 10 years, then constant	Scenario 8 - Population increases 1% per year for 10 years, then constant	Total Required Employer Contributions (\$ in millions)			Total Required Employer Contributions (% of Payroll)			Funded Ratio (AVA)		
	Active Population	Active Population	Active Population	Baseline	Scenario 7	Scenario 8	Baseline	Scenario 7	Scenario 8	Baseline	Scenario 7	Scenario 8
2021	30,197	29,895	30,499	\$885.894	\$885.894	\$885.894	39.073%	39.073%	39.073%	46.19%	46.19%	46.19%
2022	30,197	29,596	30,804	944.676	938.450	950.902	40.629%	40.629%	40.629%	45.71%	45.68%	45.74%
2023	30,197	29,300	31,112	966.871	1,025.474	910.786	40.629%	43.674%	37.764%	45.45%	45.65%	45.27%
2024	30,197	29,007	31,423	988.997	1,041.621	938.204	40.629%	43.674%	37.764%	45.50%	45.91%	45.12%
2025	30,197	28,717	31,737	1,010.868	1,057.013	965.946	40.629%	43.674%	37.764%	45.60%	46.18%	45.04%
2026	30,197	28,430	32,055	1,032.573	1,071.741	994.111	40.629%	43.674%	37.764%	45.73%	46.48%	45.01%
2027	30,197	28,146	32,375	1,054.243	1,085.930	1,022.872	40.629%	43.674%	37.764%	45.90%	46.79%	45.04%
2028	30,197	27,864	32,699	1,075.735	1,099.419	1,052.075	40.629%	43.674%	37.764%	46.09%	47.09%	45.13%
2029	30,197	27,585	33,026	1,097.009	1,112.126	1,081.752	40.629%	43.674%	37.764%	46.31%	47.40%	45.27%
2030	30,197	27,310	33,356	1,118.560	1,124.586	1,112.378	40.629%	43.674%	37.764%	46.56%	47.70%	45.47%
2031	30,197	27,310	33,356	1,140.529	1,136.962	1,144.118	40.629%	43.674%	37.764%	46.86%	48.02%	45.76%
2032	30,197	27,310	33,356	1,162.518	1,156.683	1,168.270	40.629%	43.674%	37.764%	47.20%	48.36%	46.09%
2033	30,197	27,310	33,356	1,184.677	1,176.524	1,192.637	40.629%	43.674%	37.764%	47.56%	48.73%	46.45%
2034	30,197	27,310	33,356	1,207.164	1,196.641	1,217.378	40.629%	43.674%	37.764%	47.96%	49.13%	46.86%
2035	30,197	27,310	33,356	1,229.786	1,216.814	1,242.325	40.629%	43.674%	37.764%	48.40%	49.56%	47.31%
2036	30,197	27,310	33,356	1,252.594	1,237.087	1,267.540	40.629%	43.674%	37.764%	48.88%	50.03%	47.81%
2037	30,197	27,310	33,356	1,275.478	1,257.350	1,292.914	40.629%	43.674%	37.764%	49.42%	50.54%	48.38%
2038	30,197	27,310	33,356	1,298.591	1,277.767	1,318.588	40.629%	43.674%	37.764%	50.01%	51.10%	49.00%
2039	30,197	27,310	33,356	1,322.079	1,298.501	1,344.697	40.629%	43.674%	37.764%	50.65%	51.71%	49.69%
2040	30,197	27,310	33,356	1,346.125	1,319.764	1,371.394	40.629%	43.674%	37.764%	51.36%	52.37%	50.45%
2041	30,197	27,310	33,356	1,370.972	1,341.835	1,398.893	40.629%	43.674%	37.764%	52.14%	53.10%	51.29%
2042	30,197	27,310	33,356	1,396.070	1,364.162	1,426.640	40.629%	43.674%	37.764%	52.99%	53.89%	52.21%
2043	30,197	27,310	33,356	1,422.087	1,387.475	1,455.246	40.629%	43.674%	37.764%	53.93%	54.76%	53.22%
2044	30,197	27,310	33,356	1,449.531	1,412.336	1,485.166	40.629%	43.674%	37.764%	54.96%	55.72%	54.32%
2045	30,197	27,310	33,356	1,478.006	1,438.351	1,516.002	40.629%	43.674%	37.764%	56.10%	56.78%	55.54%
2046	30,197	27,310	33,356	1,508.321	1,466.387	1,548.507	40.629%	43.674%	37.764%	57.36%	57.95%	56.88%
2047	30,197	27,310	33,356	1,540.211	1,496.157	1,582.434	40.629%	43.674%	37.764%	58.75%	59.25%	58.36%
2048	30,197	27,310	33,356	1,573.624	1,527.624	1,617.721	40.629%	43.674%	37.764%	60.28%	60.70%	59.98%
2049	30,197	27,310	33,356	1,608.582	1,560.802	1,654.394	40.629%	43.674%	37.764%	61.98%	62.31%	61.77%
2050	30,197	27,310	33,356	1,644.470	1,595.048	1,691.866	40.629%	43.674%	37.764%	63.85%	64.09%	63.72%
2051	30,197	27,310	33,356	1,680.435	1,629.459	1,729.331	40.629%	43.674%	37.764%	65.90%	66.06%	65.84%
2052	30,197	27,310	33,356	1,716.331	1,663.911	1,766.621	40.629%	43.674%	37.764%	68.14%	68.23%	68.15%
2053	30,197	27,310	33,356	1,752.315	1,698.553	1,803.903	40.629%	43.674%	37.764%	70.58%	70.60%	70.64%
2054	30,197	27,310	33,356	1,788.801	1,733.822	1,841.567	40.629%	43.674%	37.764%	73.22%	73.19%	73.33%
2055	30,197	27,310	33,356	1,825.774	1,769.701	1,879.602	40.629%	43.674%	37.764%	76.09%	76.01%	76.22%
2056	30,197	27,310	33,356	1,863.196	1,806.149	1,917.974	40.629%	43.674%	37.764%	79.18%	79.09%	79.32%
2057	30,197	27,310	33,356	1,901.023	1,843.119	1,956.639	40.629%	43.674%	37.764%	82.52%	82.43%	82.64%
2058	30,197	27,310	33,356	1,939.191	1,880.546	1,995.534	40.629%	43.674%	37.764%	86.12%	86.06%	86.19%
2059	30,197	27,310	33,356	1,977.597	1,918.328	2,034.559	40.629%	43.674%	37.764%	90.00%	90.00%	90.00%

Total Contributions FY 2021-2030	\$10,175.426	\$10,442.254	\$9,914.920
Total Contributions FY 2031-2059	\$43,856.078	\$42,807.858	\$44,862.460
Total Contributions FY 2021-2059	\$54,031.504	\$53,250.112	\$54,777.380
Total Present Value FY 2021-2059	\$16,758.764	\$16,772.874	\$16,742.664

¹In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a discount rate of 6.75 percent.

There were 30,091 active members as of June 30, 2020, plus 106 members assumed to be hired after June 30 to replace recent June retirees.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 1 (Volatile Returns Averaging 6.75%)
Based on Actuarial Valuation as of June 30, 2020

\$ in Millions																
June 30, 2020 Valuation Baseline								Stress Test Scenario 1								
Year Ending	Projected Investment Return	Total Required Employer Contribution	Actuarial Value of Assets (AVA)		Market Value of Assets (MVA)		Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total Required Employer Contribution	Actuarial Value of Assets (AVA)		Market Value of Assets (MVA)		Increase in AVA Funded Ratio	
			Funded Ratio	Funded Ratio	Funded Ratio	Funded Ratio					Funded Ratio	Funded Ratio	Funded Ratio	Funded Ratio		
June 30 2020		\$854.500	46.69%	45.43%						\$854.500	46.69%	45.43%				
2021	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%	13.65%	13.65%	885.894	46.93%	48.24%	3.67%	0.24%			
2022	6.75%	944.676	45.71%	45.32%	6.64%	-0.48%	25.00%	19.19%	944.676	49.33%	56.74%	6.64%	2.40%			
2023	6.75%	966.871	45.45%	45.38%	2.35%	-0.26%	3.78%	13.81%	921.959	51.59%	55.59%	-2.40%	2.27%			
2024	6.75%	988.997	45.50%	45.47%	2.29%	0.05%	-8.43%	7.79%	812.571	51.81%	47.50%	-11.86%	0.22%			
2025	6.75%	1,010.868	45.60%	45.59%	2.21%	0.09%	13.66%	8.94%	856.446	52.19%	50.22%	5.40%	0.37%			
2026	6.75%	1,032.573	45.73%	45.73%	2.15%	0.13%	-12.49%	5.03%	1,008.074	48.81%	41.39%	17.70%	-3.37%			
2027	6.75%	1,054.243	45.90%	45.90%	2.10%	0.17%	-10.48%	2.66%	976.044	43.62%	34.38%	-3.18%	-5.19%			
2028	6.75%	1,075.735	46.09%	46.09%	2.04%	0.19%	16.09%	4.25%	1,157.507	41.26%	37.28%	18.59%	-2.36%			
2029	6.75%	1,097.009	46.31%	46.31%	1.98%	0.22%	9.39%	4.81%	1,302.279	38.79%	38.71%	12.51%	-2.48%			
2030	6.75%	1,118.560	46.56%	46.56%	1.96%	0.25%	-6.98%	3.57%	1,271.599	36.98%	34.15%	-2.36%	-1.81%			
2031	6.75%	1,140.529	46.86%	46.86%	1.96%	0.30%	22.24%	5.14%	1,278.742	37.95%	39.21%	0.56%	0.98%			
2032	6.75%	1,162.518	47.20%	47.20%	1.93%	0.33%	-4.82%	4.27%	1,403.147	37.73%	35.74%	9.73%	-0.22%			
2033	6.75%	1,184.677	47.56%	47.56%	1.91%	0.36%	10.77%	4.76%	1,327.613	37.33%	37.34%	-5.38%	-0.40%			
2034	6.75%	1,207.164	47.96%	47.96%	1.90%	0.40%	3.66%	4.68%	1,444.034	38.14%	36.92%	8.77%	0.80%			
2035	6.75%	1,229.786	48.40%	48.40%	1.87%	0.44%	-8.45%	3.75%	1,441.258	36.46%	32.25%	-0.19%	-1.68%			
2036	6.75%	1,252.594	48.88%	48.88%	1.85%	0.48%	8.22%	4.02%	1,492.831	35.85%	33.09%	3.58%	-0.61%			
2037	6.75%	1,275.478	49.42%	49.42%	1.83%	0.53%	8.03%	4.25%	1,645.359	35.41%	34.35%	10.22%	-0.44%			
2038	6.75%	1,298.591	50.01%	50.01%	1.81%	0.59%	-3.83%	3.79%	1,664.298	34.35%	31.91%	1.15%	-1.06%			
2039	6.75%	1,322.079	50.65%	50.65%	1.81%	0.65%	18.79%	4.53%	1,684.265	35.35%	36.25%	1.20%	1.00%			
2040	6.75%	1,346.125	51.36%	51.36%	1.82%	0.71%	-6.89%	3.92%	1,805.762	35.54%	32.98%	7.21%	0.19%			
2041	6.75%	1,370.972	52.14%	52.14%	1.85%	0.78%	23.64%	4.79%	1,739.015	36.68%	39.01%	-3.70%	1.14%			
2042	6.75%	1,396.070	52.99%	52.99%	1.83%	0.85%	12.45%	5.12%	1,906.091	39.70%	42.74%	9.61%	3.02%			
2043	6.75%	1,422.087	53.93%	53.93%	1.86%	0.94%	10.09%	5.33%	1,782.356	42.01%	45.50%	-6.49%	2.31%			
2044	6.75%	1,449.531	54.96%	54.96%	1.93%	1.03%	13.25%	5.65%	1,749.170	46.13%	49.72%	-1.86%	4.12%			
2045	6.75%	1,478.006	56.10%	56.10%	1.96%	1.14%	13.62%	5.96%	1,737.726	50.06%	54.55%	-0.65%	3.92%			
2046	6.75%	1,508.321	57.36%	57.36%	2.05%	1.26%	-13.60%	5.13%	1,672.119	50.86%	45.65%	-3.78%	0.80%			
2047	6.75%	1,540.211	58.75%	58.75%	2.11%	1.39%	1.20%	4.98%	1,582.825	50.35%	44.07%	-5.34%	-0.50%			
2048	6.75%	1,573.624	60.28%	60.28%	2.17%	1.54%	17.25%	5.40%	2,051.827	51.39%	50.47%	29.63%	1.04%			
2049	6.75%	1,608.582	61.98%	61.98%	2.22%	1.70%	2.04%	5.28%	2,203.824	51.47%	51.01%	7.41%	0.08%			
2050	6.75%	1,644.470	63.85%	63.85%	2.23%	1.87%	17.97%	5.68%	2,041.762	54.91%	58.79%	-7.35%	3.44%			
2051	6.75%	1,680.435	65.90%	65.90%	2.19%	2.05%	-6.37%	5.27%	2,206.021	57.85%	54.64%	8.04%	2.95%			
2052	6.75%	1,716.331	68.14%	68.14%	2.14%	2.24%	17.49%	5.63%	1,932.627	60.56%	62.41%	-12.39%	2.71%			
2053	6.75%	1,752.315	70.58%	70.58%	2.10%	2.44%	16.00%	5.93%	2,462.278	66.83%	71.99%	27.41%	6.26%			
2054	6.75%	1,788.801	73.22%	73.22%	2.08%	2.65%	0.47%	5.77%	2,086.041	70.05%	71.18%	-15.28%	3.22%			
2055	6.75%	1,825.774	76.09%	76.09%	2.07%	2.86%	14.39%	6.00%	1,629.282	75.23%	78.63%	-21.90%	5.18%			
2056	6.75%	1,863.196	79.18%	79.18%	2.05%	3.09%	25.00%	6.49%	2,144.856	84.28%	96.51%	31.64%	9.05%			
2057	6.75%	1,901.023	82.52%	82.52%	2.03%	3.34%	13.35%	6.67%	1,434.933	92.27%	105.84%	-33.10%	7.99%			
2058	6.75%	1,939.191	86.12%	86.12%	2.01%	3.60%	-1.07%	6.46%	206.223	96.58%	98.19%	-85.63%	4.32%			
2059	6.75%	1,977.597	90.00%	90.00%	1.98%	3.88%	18.41%	6.75%	210.243	102.65%	109.27%	1.95%	6.07%			
Total Contributions FY 2021-2059		\$54,031.504							\$58,103.577							
Total Present Value FY 2021-2059¹		\$16,758.764							\$18,218.969							
Difference from June 30, 2020 Valuation																
Total Contributions FY 2021-2059		\$0.000							\$4,072.073							
Total Present Value FY 2021-2059¹		\$0.000							\$1,460.205							
Maximum Annual Increase							6.64%	3.88%					31.64%	9.05%		
Maximum Annual Decrease							1.81%	-0.50%					-85.63%	-5.19%		

¹ In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a discount rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 1 (Volatile Returns Averaging 6.75%)
Based on Actuarial Valuation as of June 30, 2020
Breakout of Contribution Requirements

Year Ending June 30	\$ in Millions June 30, 2020 Valuation Baseline					\$ in Millions Stress Test Scenario 1					Difference				
	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution
	Contributions	Contributions	Contributions	P.A. 100-0465	Contribution	Contributions	Contributions	Contributions	P.A. 100-0465	Contribution	Contributions	Contributions	Contributions	P.A. 100-0465	Contribution
2020					\$854.500					\$854.500					\$0.000
2021	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$0.000	\$0.000	\$0.000	\$0.000	\$0.000
2022	653.694	13.486	12.649	264.848	944.676	653.694	13.486	12.649	264.848	944.676	0.000	0.000	0.000	0.000	0.000
2023	671.117	13.803	12.946	269.005	966.871	626.206	13.803	12.946	269.005	921.959	-44.911	0.000	0.000	0.000	-44.912
2024	689.059	14.118	13.242	272.577	988.997	512.633	14.118	13.242	272.577	812.571	-176.426	0.000	0.000	0.000	-176.426
2025	707.478	14.431	13.535	275.424	1,010.868	553.056	14.431	13.535	275.424	856.446	-154.422	0.000	0.000	0.000	-154.422
2026	726.144	14.741	13.826	277.863	1,032.573	701.645	14.741	13.826	277.863	1,008.074	-24.499	0.000	0.000	0.000	-24.499
2027	745.310	15.050	14.116	279.767	1,054.243	667.111	15.050	14.116	279.767	976.044	-78.199	0.000	0.000	0.000	-78.199
2028	765.039	15.357	14.404	280.936	1,075.735	846.810	15.357	14.404	280.936	1,157.507	81.772	0.000	0.000	0.000	81.772
2029	785.207	15.660	14.688	281.453	1,097.009	990.477	15.660	14.688	281.453	1,302.279	205.270	0.000	0.000	0.000	205.270
2030	806.268	15.968	14.977	281.347	1,118.560	959.307	15.968	14.977	281.347	1,271.599	153.039	0.000	0.000	0.000	153.039
2031	828.304	16.282	15.271	280.673	1,140.529	966.516	16.282	15.271	280.673	1,278.742	138.212	0.000	0.000	0.000	138.213
2032	850.883	16.596	15.565	279.473	1,162.518	1,091.513	16.596	15.565	279.473	1,403.147	240.629	0.000	0.000	0.000	240.629
2033	874.185	16.912	15.862	277.718	1,184.677	1,017.121	16.912	15.862	277.718	1,327.613	142.937	0.000	0.000	0.000	142.936
2034	898.459	17.233	16.163	275.309	1,207.164	1,135.329	17.233	16.163	275.309	1,444.034	236.870	0.000	0.000	0.000	236.870
2035	923.483	17.556	16.466	272.281	1,229.786	1,134.955	17.556	16.466	272.281	1,441.258	211.472	0.000	0.000	0.000	211.472
2036	951.233	17.881	16.772	266.707	1,252.594	1,191.470	17.881	16.772	266.707	1,492.831	240.237	0.000	0.000	0.000	240.237
2037	979.767	18.208	17.078	260.425	1,275.478	1,349.647	18.208	17.078	260.425	1,645.359	369.880	0.000	0.000	0.000	369.881
2038	1,009.127	18.538	17.387	253.538	1,298.591	1,374.834	18.538	17.387	253.538	1,664.298	365.707	0.000	0.000	0.000	365.707
2039	1,039.342	18.873	17.702	246.162	1,322.079	1,401.528	18.873	17.702	246.162	1,684.265	362.185	0.000	0.000	0.000	362.186
2040	1,070.428	19.217	18.024	238.456	1,346.125	1,530.066	19.217	18.024	238.456	1,805.762	459.638	0.000	0.000	0.000	459.637
2041	1,102.862	19.571	18.357	230.182	1,370.972	1,470.906	19.571	18.357	230.182	1,739.015	368.043	0.000	0.000	0.000	368.043
2042	1,135.806	19.930	18.693	221.642	1,396.070	1,645.826	19.930	18.693	221.642	1,906.091	510.021	0.000	0.000	0.000	510.021
2043	1,169.222	20.301	19.041	213.523	1,422.087	1,529.491	20.301	19.041	213.523	1,782.356	360.269	0.000	0.000	0.000	360.269
2044	1,203.458	20.693	19.408	205.971	1,449.531	1,503.097	20.693	19.408	205.971	1,749.170	299.639	0.000	0.000	0.000	299.639
2045	1,237.567	21.099	19.790	199.551	1,478.006	1,497.287	21.099	19.790	199.551	1,737.726	259.720	0.000	0.000	0.000	259.720
2046	1,272.090	21.532	20.196	194.503	1,508.321	1,435.888	21.532	20.196	194.503	1,672.119	163.798	0.000	0.000	0.000	163.798
2047	1,306.623	21.987	20.623	190.978	1,540.211	1,349.238	21.987	20.623	190.978	1,582.825	42.615	0.000	0.000	0.000	42.614
2048	1,341.078	22.464	21.070	189.012	1,573.624	1,819.281	22.464	21.070	189.012	2,051.827	478.203	0.000	0.000	0.000	478.203
2049	1,375.782	22.963	21.538	188.299	1,608.582	1,971.023	22.963	21.538	188.299	2,203.824	595.242	0.000	0.000	0.000	595.242
2050	1,410.697	23.476	22.019	188.279	1,644.470	1,807.989	23.476	22.019	188.279	2,041.762	397.291	0.000	0.000	0.000	397.292
2051	1,445.114	23.989	22.500	188.832	1,680.435	1,970.700	23.989	22.500	188.832	2,206.021	525.585	0.000	0.000	0.000	525.586
2052	1,479.004	24.502	22.981	189.844	1,716.331	1,695.300	24.502	22.981	189.844	1,932.627	216.296	0.000	0.000	0.000	216.296
2053	1,512.436	25.015	23.463	191.401	1,752.315	2,222.399	25.015	23.463	191.401	2,462.278	709.963	0.000	0.000	0.000	709.963
2054	1,545.815	25.536	23.951	193.499	1,788.801	1,843.055	25.536	23.951	193.499	2,086.041	297.240	0.000	0.000	0.000	297.240
2055	1,579.190	26.064	24.446	196.074	1,825.774	1,382.698	26.064	24.446	196.074	1,629.282	-196.492	0.000	0.000	0.000	-196.492
2056	1,612.569	26.598	24.947	199.082	1,863.196	1,894.229	26.598	24.947	199.082	2,144.856	281.660	0.000	0.000	0.000	281.660
2057	1,645.949	27.138	25.454	202.483	1,901.023	1,179.858	27.138	25.454	202.483	1,434.933	-466.090	0.000	0.000	0.000	-466.090
2058	1,679.319	27.683	25.965	206.223	1,939.191	0.000	0.000	0.000	206.223	206.223	-1,679.319	-27.683	-25.965	0.000	-1,732.968
2059	1,712.644	28.231	26.479	210.243	1,977.597	0.000	0.000	0.000	210.243	210.243	-1,712.644	-28.231	-26.479	0.000	-1,767.354
Total Contributions FY 2021-2059	\$43,347.604	\$771.831	\$723.924	\$9,188.144	\$54,031.504	\$47,528.033	\$715.917	\$671.481	\$9,188.144	\$58,103.577	\$4,180.429	-\$55.914	-\$52.444	\$0.000	\$4,072.073
Total Present Value FY 2021-2059¹	\$12,677.551	\$239.727	\$224.847	\$3,616.639	\$16,758.764	\$14,146.812	\$235.053	\$220.464	\$3,616.639	\$18,218.969	\$1,469.260	-\$4.673	-\$4.383	\$0.000	\$1,460.204

¹In calculating the present value of contributions, total required contributions were assumed to occur mid-year, using a rate of 6.75 percent.

Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 2 (Static Returns of 4.12%)
Based on Actuarial Valuation as of June 30, 2020

\$ in Millions															
Year Ending	June 30, 2020 Valuation Baseline							Stress Test Scenario 2							
	Projected Investment Return	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Total Required Employer Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Total Required Employer Contribution	Increase in AVA Funded Ratio		
June 30 2020		\$854.500	46.69%	45.43%					\$854.500	46.69%	45.43%				
2021	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%	4.12%	4.12%	885.894	45.91%	44.17%	3.67%	-0.78%		
2022	6.75%	944.676	45.71%	45.32%	6.64%	-0.48%	4.12%	4.12%	944.676	44.85%	43.05%	6.64%	-1.06%		
2023	6.75%	966.871	45.45%	45.38%	2.35%	-0.26%	4.12%	4.12%	983.972	43.78%	42.01%	4.16%	-1.08%		
2024	6.75%	988.997	45.50%	45.47%	2.29%	0.05%	4.12%	4.12%	1,023.604	42.76%	41.03%	4.03%	-1.01%		
2025	6.75%	1,010.868	45.60%	45.59%	2.21%	0.09%	4.12%	4.12%	1,063.403	41.81%	40.11%	3.89%	-0.96%		
2026	6.75%	1,032.573	45.73%	45.73%	2.15%	0.13%	4.12%	4.12%	1,103.511	40.91%	39.26%	3.77%	-0.89%		
2027	6.75%	1,054.243	45.90%	45.90%	2.10%	0.17%	4.12%	4.12%	1,144.014	40.09%	38.47%	3.67%	-0.83%		
2028	6.75%	1,075.735	46.09%	46.09%	2.04%	0.19%	4.12%	4.12%	1,184.832	39.33%	37.74%	3.57%	-0.76%		
2029	6.75%	1,097.009	46.31%	46.31%	1.98%	0.22%	4.12%	4.12%	1,225.867	38.63%	37.08%	3.46%	-0.70%		
2030	6.75%	1,118.560	46.56%	46.56%	1.96%	0.25%	4.12%	4.12%	1,267.757	37.99%	36.47%	3.42%	-0.64%		
2031	6.75%	1,140.529	46.86%	46.86%	1.96%	0.30%	4.12%	4.12%	1,310.709	37.45%	35.96%	3.39%	-0.54%		
2032	6.75%	1,162.518	47.20%	47.20%	1.93%	0.33%	4.12%	4.12%	1,354.222	36.98%	35.51%	3.32%	-0.47%		
2033	6.75%	1,184.677	47.56%	47.56%	1.91%	0.36%	4.12%	4.12%	1,398.655	36.57%	35.13%	3.28%	-0.41%		
2034	6.75%	1,207.164	47.96%	47.96%	1.90%	0.40%	4.12%	4.12%	1,444.127	36.24%	34.81%	3.25%	-0.34%		
2035	6.75%	1,229.786	48.40%	48.40%	1.87%	0.44%	4.12%	4.12%	1,490.580	35.98%	34.56%	3.22%	-0.26%		
2036	6.75%	1,252.594	48.88%	48.88%	1.85%	0.48%	4.12%	4.12%	1,538.052	35.79%	34.39%	3.18%	-0.18%		
2037	6.75%	1,275.478	49.42%	49.42%	1.83%	0.53%	4.12%	4.12%	1,586.562	35.70%	34.30%	3.15%	-0.10%		
2038	6.75%	1,298.591	50.01%	50.01%	1.81%	0.59%	4.12%	4.12%	1,636.331	35.69%	34.30%	3.14%	-0.01%		
2039	6.75%	1,322.079	50.65%	50.65%	1.81%	0.65%	4.12%	4.12%	1,687.623	35.77%	34.39%	3.13%	0.09%		
2040	6.75%	1,346.125	51.36%	51.36%	1.82%	0.71%	4.12%	4.12%	1,740.875	35.96%	34.58%	3.16%	0.19%		
2041	6.75%	1,370.972	52.14%	52.14%	1.85%	0.78%	4.12%	4.12%	1,796.561	36.26%	34.87%	3.20%	0.29%		
2042	6.75%	1,396.070	52.99%	52.99%	1.83%	0.85%	4.12%	4.12%	1,854.188	36.67%	35.27%	3.21%	0.41%		
2043	6.75%	1,422.087	53.93%	53.93%	1.86%	0.94%	4.12%	4.12%	1,914.796	37.20%	35.79%	3.27%	0.54%		
2044	6.75%	1,449.531	54.96%	54.96%	1.93%	1.03%	4.12%	4.12%	1,979.339	37.89%	36.46%	3.37%	0.69%		
2045	6.75%	1,478.006	56.10%	56.10%	1.96%	1.14%	4.12%	4.12%	2,047.691	38.74%	37.28%	3.45%	0.85%		
2046	6.75%	1,508.321	57.36%	57.36%	2.05%	1.26%	4.12%	4.12%	2,121.339	39.78%	38.29%	3.60%	1.04%		
2047	6.75%	1,540.211	58.75%	58.75%	2.11%	1.39%	4.12%	4.12%	2,200.475	41.04%	39.51%	3.73%	1.25%		
2048	6.75%	1,573.624	60.28%	60.28%	2.17%	1.54%	4.12%	4.12%	2,286.069	42.53%	40.96%	3.89%	1.50%		
2049	6.75%	1,608.582	61.98%	61.98%	2.22%	1.70%	4.12%	4.12%	2,378.744	44.31%	42.68%	4.05%	1.77%		
2050	6.75%	1,644.470	63.85%	63.85%	2.23%	1.87%	4.12%	4.12%	2,478.678	46.38%	44.69%	4.20%	2.07%		
2051	6.75%	1,680.435	65.90%	65.90%	2.19%	2.05%	4.12%	4.12%	2,586.490	48.79%	47.02%	4.35%	2.41%		
2052	6.75%	1,716.331	68.14%	68.14%	2.14%	2.24%	4.12%	4.12%	2,703.959	51.56%	49.70%	4.54%	2.77%		
2053	6.75%	1,752.315	70.58%	70.58%	2.10%	2.44%	4.12%	4.12%	2,834.271	54.74%	52.77%	4.82%	3.18%		
2054	6.75%	1,788.801	73.22%	73.22%	2.08%	2.65%	4.12%	4.12%	2,982.625	58.38%	56.29%	5.23%	3.64%		
2055	6.75%	1,825.774	76.09%	76.09%	2.07%	2.86%	4.12%	4.12%	3,156.531	62.56%	60.34%	5.83%	4.18%		
2056	6.75%	1,863.196	79.18%	79.18%	2.05%	3.09%	4.12%	4.12%	3,367.430	67.40%	65.02%	6.68%	4.84%		
2057	6.75%	1,901.023	82.52%	82.52%	2.03%	3.34%	4.12%	4.12%	3,639.686	73.08%	70.52%	8.08%	5.68%		
2058	6.75%	1,939.191	86.12%	86.12%	2.01%	3.60%	4.12%	4.12%	4,028.533	79.94%	77.17%	10.68%	6.86%		
2059	6.75%	1,977.597	90.00%	90.00%	1.98%	3.88%	4.12%	4.12%	4,620.541	88.57%	85.54%	14.70%	8.63%		
Total Contributions FY 2021-2059		\$54,031.504							\$76,993.212						
Total Present Value FY 2021-2059¹		\$16,758.764							\$20,690.078						
Difference from June 30, 2020 Valuation															
Total Contributions FY 2021-2059		\$0.000							\$22,961.708						
Total Present Value FY 2021-2059¹		\$0.000							\$3,931.314						
Maximum Annual Increase					6.64%	3.88%					14.70%	8.63%			
Maximum Annual Decrease					1.81%	-0.50%					3.13%	-1.08%			

¹In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago

Comparison of Actuarial Valuation Results and Stress Testing Scenario 2 (Static Returns of 4.12%)

Based on Actuarial Valuation as of June 30, 2020

Breakout of Contribution Requirements

Year Ending June 30	\$ in Millions										Difference				
	June 30, 2020 Valuation Baseline					Stress Test Scenario 2									
	Required Board of Education Contributions	Additional Board of Education Contributions	State Contributions	Total Required Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	State Contributions	Total Required Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	State Contributions	Total Required Pursuant to P.A. 100-0465	Total Required Employer Contribution
2020					\$854.500					\$854.500					\$0.000
2021	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$0.000	\$0.000	\$0.000	\$0.000	0.000
2022	653.694	13.486	12.649	264.848	944.676	653.694	13.486	12.649	264.848	944.676	0.000	0.000	0.000	0.000	0.000
2023	671.117	13.803	12.946	269.005	966.871	688.219	13.803	12.946	269.005	983.972	17.102	0.000	0.000	0.000	17.101
2024	689.059	14.118	13.242	272.577	988.997	723.666	14.118	13.242	272.577	1,023.604	34.608	0.000	0.000	0.000	34.607
2025	707.478	14.431	13.535	275.424	1,010.868	760.013	14.431	13.535	275.424	1,063.403	52.535	0.000	0.000	0.000	52.535
2026	726.144	14.741	13.826	277.863	1,032.573	797.083	14.741	13.826	277.863	1,103.511	70.938	0.000	0.000	0.000	70.938
2027	745.310	15.050	14.116	279.767	1,054.243	835.081	15.050	14.116	279.767	1,144.014	89.771	0.000	0.000	0.000	89.771
2028	765.039	15.357	14.404	280.936	1,075.735	874.135	15.357	14.404	280.936	1,184.832	109.097	0.000	0.000	0.000	109.097
2029	785.207	15.660	14.688	281.453	1,097.009	914.065	15.660	14.688	281.453	1,225.867	128.858	0.000	0.000	0.000	128.858
2030	806.268	15.968	14.977	281.347	1,118.560	955.465	15.968	14.977	281.347	1,267.757	149.197	0.000	0.000	0.000	149.197
2031	828.304	16.282	15.271	280.673	1,140.529	998.483	16.282	15.271	280.673	1,310.709	170.180	0.000	0.000	0.000	170.180
2032	850.883	16.596	15.565	279.473	1,162.518	1,042.588	16.596	15.565	279.473	1,354.222	191.704	0.000	0.000	0.000	191.704
2033	874.185	16.912	15.862	277.718	1,184.677	1,088.163	16.912	15.862	277.718	1,398.655	213.978	0.000	0.000	0.000	213.978
2034	898.459	17.233	16.163	275.309	1,207.164	1,135.422	17.233	16.163	275.309	1,444.127	236.963	0.000	0.000	0.000	236.963
2035	923.483	17.556	16.466	272.281	1,229.786	1,184.277	17.556	16.466	272.281	1,490.580	260.794	0.000	0.000	0.000	260.794
2036	951.233	17.881	16.772	266.707	1,252.594	1,236.692	17.881	16.772	266.707	1,538.052	285.459	0.000	0.000	0.000	285.458
2037	979.767	18.208	17.078	260.425	1,275.478	1,290.851	18.208	17.078	260.425	1,586.562	311.084	0.000	0.000	0.000	311.084
2038	1,009.127	18.538	17.387	253.538	1,298.591	1,346.867	18.538	17.387	253.538	1,636.331	337.740	0.000	0.000	0.000	337.740
2039	1,039.342	18.873	17.702	246.162	1,322.079	1,404.885	18.873	17.702	246.162	1,687.623	365.543	0.000	0.000	0.000	365.544
2040	1,070.428	19.217	18.024	238.456	1,346.125	1,465.179	19.217	18.024	238.456	1,740.875	394.751	0.000	0.000	0.000	394.750
2041	1,102.862	19.571	18.357	230.182	1,370.972	1,528.452	19.571	18.357	230.182	1,796.561	425.589	0.000	0.000	0.000	425.589
2042	1,135.806	19.930	18.693	221.642	1,396.070	1,593.924	19.930	18.693	221.642	1,854.188	458.118	0.000	0.000	0.000	458.118
2043	1,169.222	20.301	19.041	213.523	1,422.087	1,661.930	20.301	19.041	213.523	1,914.796	492.709	0.000	0.000	0.000	492.709
2044	1,203.458	20.693	19.408	205.971	1,449.531	1,733.267	20.693	19.408	205.971	1,979.339	529.809	0.000	0.000	0.000	529.808
2045	1,237.567	21.099	19.790	199.551	1,478.006	1,807.251	21.099	19.790	199.551	2,047.691	569.685	0.000	0.000	0.000	569.685
2046	1,272.090	21.532	20.196	194.503	1,508.321	1,885.108	21.532	20.196	194.503	2,121.339	613.017	0.000	0.000	0.000	613.018
2047	1,306.623	21.987	20.623	190.978	1,540.211	1,966.887	21.987	20.623	190.978	2,200.475	660.264	0.000	0.000	0.000	660.264
2048	1,341.078	22.464	21.070	189.012	1,573.624	2,053.523	22.464	21.070	189.012	2,286.069	712.445	0.000	0.000	0.000	712.445
2049	1,375.782	22.963	21.538	188.299	1,608.582	2,145.943	22.963	21.538	188.299	2,378.744	770.161	0.000	0.000	0.000	770.162
2050	1,410.697	23.476	22.019	188.279	1,644.470	2,244.904	23.476	22.019	188.279	2,478.678	834.207	0.000	0.000	0.000	834.208
2051	1,445.114	23.989	22.500	188.832	1,680.435	2,351.169	23.989	22.500	188.832	2,586.490	906.054	0.000	0.000	0.000	906.055
2052	1,479.004	24.502	22.981	189.844	1,716.331	2,466.632	24.502	22.981	189.844	2,703.959	987.628	0.000	0.000	0.000	987.628
2053	1,512.436	25.015	23.463	191.401	1,752.315	2,594.392	25.015	23.463	191.401	2,834.271	1,081.956	0.000	0.000	0.000	1,081.956
2054	1,545.815	25.536	23.951	193.499	1,788.801	2,739.639	25.536	23.951	193.499	2,982.625	1,193.824	0.000	0.000	0.000	1,193.824
2055	1,579.190	26.064	24.446	196.074	1,825.774	2,909.947	26.064	24.446	196.074	3,156.531	1,330.757	0.000	0.000	0.000	1,330.757
2056	1,612.569	26.598	24.947	199.082	1,863.196	3,116.803	26.598	24.947	199.082	3,367.430	1,504.234	0.000	0.000	0.000	1,504.234
2057	1,645.949	27.138	25.454	202.483	1,901.023	3,384.611	27.138	25.454	202.483	3,639.686	1,738.662	0.000	0.000	0.000	1,738.663
2058	1,679.319	27.683	25.965	206.223	1,939.191	3,768.662	27.683	25.965	206.223	4,028.533	2,089.343	0.000	0.000	0.000	2,089.342
2059	1,712.644	28.231	26.479	210.243	1,977.597	4,355.588	28.231	26.479	210.243	4,620.541	2,642.944	0.000	0.000	0.000	2,642.944
Total Contributions FY 2021-2059	\$43,347.604	\$771.831	\$723.924	\$9,188.144	\$54,031.504	\$66,309.311	\$771.831	\$723.924	\$9,188.144	\$76,993.212	\$22,961.707	\$0.000	\$0.000	\$0.000	\$22,961.708
Total Present Value FY 2021-2059¹	\$12,677.551	\$239.727	\$224.847	\$3,616.639	\$16,758.764	\$16,608.866	\$239.727	\$224.847	\$3,616.639	\$20,690.078	\$3,931.314	\$0.000	\$0.000	\$0.000	\$3,931.314

¹ In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.

Public School Teachers' Pension and Retirement Fund of Chicago

Comparison of Actuarial Valuation Results and Stress Testing Scenario 3 (Volatile Returns Averaging 4.12%) Based on Actuarial Valuation as of June 30, 2020

\$ in Millions															
	June 30, 2020 Valuation Baseline							Stress Test Scenario 3							
	Year Ending June 30 2020	Projected Investment Return	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in		Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in		
Total Required Employer Contribution						Increase in AVA Funded Ratio	Total Required Employer Contribution						Increase in AVA Funded Ratio		
			\$854.500	46.69%	45.43%					\$854.500	46.69%	45.43%			
2021	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%	-0.02%	-0.02%	885.894	45.47%	42.40%	3.67%	-1.22%		
2022	6.75%	944.676	45.71%	45.32%	6.64%	-0.48%	2.27%	1.12%	944.676	43.76%	40.51%	6.64%	-1.71%		
2023	6.75%	966.871	45.45%	45.38%	2.35%	-0.26%	4.27%	2.16%	1,010.880	42.13%	39.56%	7.01%	-1.64%		
2024	6.75%	988.997	45.50%	45.47%	2.29%	0.05%	11.27%	4.36%	1,061.934	41.24%	41.32%	5.05%	-0.89%		
2025	6.75%	1,010.868	45.60%	45.59%	2.21%	0.09%	-1.67%	3.13%	1,100.641	40.29%	38.31%	3.64%	-0.95%		
2026	6.75%	1,032.573	45.73%	45.73%	2.15%	0.13%	1.73%	2.89%	1,096.403	39.22%	36.54%	-0.39%	-1.08%		
2027	6.75%	1,054.243	45.90%	45.90%	2.10%	0.17%	-4.55%	1.80%	1,175.329	37.60%	32.86%	7.20%	-1.62%		
2028	6.75%	1,075.735	46.09%	46.09%	2.04%	0.19%	6.76%	2.40%	1,231.077	35.64%	32.96%	4.74%	-1.96%		
2029	6.75%	1,097.009	46.31%	46.31%	1.98%	0.22%	7.02%	2.91%	1,325.544	34.62%	33.42%	7.67%	-1.02%		
2030	6.75%	1,118.560	46.56%	46.56%	1.96%	0.25%	-1.77%	2.43%	1,351.516	33.36%	31.20%	1.96%	-1.26%		
2031	6.75%	1,140.529	46.86%	46.86%	1.96%	0.30%	13.14%	3.36%	1,376.468	33.47%	33.38%	1.85%	0.11%		
2032	6.75%	1,162.518	47.20%	47.20%	1.93%	0.33%	9.96%	3.89%	1,455.989	34.10%	35.02%	5.78%	0.64%		
2033	6.75%	1,184.677	47.56%	47.56%	1.91%	0.36%	10.39%	4.38%	1,445.401	34.99%	36.82%	-0.73%	0.89%		
2034	6.75%	1,207.164	47.96%	47.96%	1.90%	0.40%	-18.10%	2.59%	1,451.437	34.41%	28.98%	0.42%	-0.58%		
2035	6.75%	1,229.786	48.40%	48.40%	1.87%	0.44%	3.55%	2.65%	1,452.228	33.04%	28.30%	0.05%	-1.37%		
2036	6.75%	1,252.594	48.88%	48.88%	1.85%	0.48%	10.83%	3.14%	1,675.594	32.22%	30.15%	15.38%	-0.81%		
2037	6.75%	1,275.478	49.42%	49.42%	1.83%	0.53%	-0.74%	2.91%	1,726.627	30.63%	29.04%	3.05%	-1.59%		
2038	6.75%	1,298.591	50.01%	50.01%	1.81%	0.59%	-12.12%	2.01%	1,731.545	29.63%	24.89%	0.28%	-1.00%		
2039	6.75%	1,322.079	50.65%	50.65%	1.81%	0.65%	4.80%	2.16%	1,816.566	28.89%	25.26%	4.91%	-0.74%		
2040	6.75%	1,346.125	51.36%	51.36%	1.82%	0.71%	-0.18%	2.04%	1,984.755	27.94%	24.94%	9.26%	-0.96%		
2041	6.75%	1,370.972	52.14%	52.14%	1.85%	0.78%	-4.80%	1.70%	2,033.823	26.85%	23.66%	2.47%	-1.09%		
2042	6.75%	1,396.070	52.99%	52.99%	1.83%	0.85%	25.43%	2.68%	2,117.705	28.06%	29.06%	4.12%	1.21%		
2043	6.75%	1,422.087	53.93%	53.93%	1.86%	0.94%	5.78%	2.81%	2,237.355	29.75%	30.79%	5.65%	1.69%		
2044	6.75%	1,449.531	54.96%	54.96%	1.93%	1.03%	12.07%	3.18%	2,151.181	32.04%	34.06%	-3.85%	2.29%		
2045	6.75%	1,478.006	56.10%	56.10%	1.96%	1.14%	21.85%	3.87%	2,202.241	36.44%	40.86%	2.37%	4.40%		
2046	6.75%	1,508.321	57.36%	57.36%	2.05%	1.26%	-2.24%	3.63%	2,192.808	39.30%	39.76%	-0.43%	2.85%		
2047	6.75%	1,540.211	58.75%	58.75%	2.11%	1.39%	21.07%	4.23%	2,055.077	43.25%	46.93%	-6.28%	3.95%		
2048	6.75%	1,573.624	60.28%	60.28%	2.17%	1.54%	13.93%	4.56%	2,241.781	48.39%	52.86%	9.09%	5.14%		
2049	6.75%	1,608.582	61.98%	61.98%	2.22%	1.70%	5.24%	4.58%	2,054.050	51.93%	54.62%	-8.37%	3.54%		
2050	6.75%	1,644.470	63.85%	63.85%	2.23%	1.87%	25.00%	5.20%	1,945.451	58.52%	66.40%	-5.29%	6.59%		
2051	6.75%	1,680.435	65.90%	65.90%	2.19%	2.05%	-15.10%	4.48%	2,028.356	61.01%	55.68%	4.26%	2.49%		
2052	6.75%	1,716.331	68.14%	68.14%	2.14%	2.24%	-4.97%	4.17%	1,511.843	59.70%	50.52%	-25.46%	-1.31%		
2053	6.75%	1,752.315	70.58%	70.58%	2.10%	2.44%	0.86%	4.07%	2,466.609	60.19%	51.05%	63.15%	0.48%		
2054	6.75%	1,788.801	73.22%	73.22%	2.08%	2.65%	28.80%	4.72%	2,992.531	62.28%	66.54%	21.32%	2.10%		
2055	6.75%	1,825.774	76.09%	76.09%	2.07%	2.86%	-4.80%	4.44%	3,309.420	66.80%	65.65%	10.59%	4.51%		
2056	6.75%	1,863.196	79.18%	79.18%	2.05%	3.09%	10.29%	4.60%	2,190.241	70.64%	71.23%	-33.82%	3.84%		
2057	6.75%	1,901.023	82.52%	82.52%	2.03%	3.34%	12.58%	4.80%	3,295.877	79.47%	81.82%	50.48%	8.83%		
2058	6.75%	1,939.191	86.12%	86.12%	2.01%	3.60%	-3.41%	4.58%	2,898.231	83.27%	79.90%	-12.06%	3.80%		
2059	6.75%	1,977.597	90.00%	90.00%	1.98%	3.88%	-11.92%	4.12%	1,705.888	82.17%	68.26%	-41.14%	-1.10%		
Total Contributions FY 2021-2059			\$54,031.504						\$70,930.972						
Total Present Value FY 2021-2059¹			\$16,758.764						\$20,627.474						
Difference from June 30, 2020 Valuation															
Total Contributions FY 2021-2059			\$0.000						\$16,899.468						
Total Present Value FY 2021-2059¹			\$0.000						\$3,868.710						
Maximum Annual Increase						6.64%	3.88%						63.15%	8.83%	
Maximum Annual Decrease						1.81%	-0.50%						-41.14%	-1.96%	

¹In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 3 (Volatile Returns Averaging 4.12%)
Based on Actuarial Valuation as of June 30, 2020
Breakout of Contribution Requirements

\$ in Millions

	June 30, 2020 Valuation Baseline					Stress Test Scenario 3					Difference				
	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution
Year Ending June 30															
2020					\$854.500					\$854.500					\$0.000
2021	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$0.000	\$0.000	\$0.000	\$0.000	0.000
2022	653.694	13.486	12.649	264.848	944.676	653.694	13.486	12.649	264.848	944.676	0.000	0.000	0.000	0.000	0.000
2023	671.117	13.803	12.946	269.005	966.871	715.127	13.803	12.946	269.005	1,010.880	44.009	0.000	0.000	0.000	44.009
2024	689.059	14.118	13.242	272.577	988.997	761.996	14.118	13.242	272.577	1,061.934	72.937	0.000	0.000	0.000	72.937
2025	707.478	14.431	13.535	275.424	1,010.868	797.251	14.431	13.535	275.424	1,100.641	89.773	0.000	0.000	0.000	89.773
2026	726.144	14.741	13.826	277.863	1,032.573	789.974	14.741	13.826	277.863	1,096.403	63.830	0.000	0.000	0.000	63.830
2027	745.310	15.050	14.116	279.767	1,054.243	866.396	15.050	14.116	279.767	1,175.329	121.086	0.000	0.000	0.000	121.086
2028	765.039	15.357	14.404	280.936	1,075.735	920.381	15.357	14.404	280.936	1,231.077	155.342	0.000	0.000	0.000	155.342
2029	785.207	15.660	14.688	281.453	1,097.009	1,013.742	15.660	14.688	281.453	1,325.544	228.534	0.000	0.000	0.000	228.535
2030	806.268	15.968	14.977	281.347	1,118.560	1,039.224	15.968	14.977	281.347	1,351.516	232.956	0.000	0.000	0.000	232.956
2031	828.304	16.282	15.271	280.673	1,140.529	1,064.242	16.282	15.271	280.673	1,376.468	235.938	0.000	0.000	0.000	235.939
2032	850.883	16.596	15.565	279.473	1,162.518	1,144.355	16.596	15.565	279.473	1,455.989	293.472	0.000	0.000	0.000	293.471
2033	874.185	16.912	15.862	277.718	1,184.677	1,134.909	16.912	15.862	277.718	1,445.401	260.725	0.000	0.000	0.000	260.724
2034	898.459	17.233	16.163	275.309	1,207.164	1,142.731	17.233	16.163	275.309	1,451.437	244.272	0.000	0.000	0.000	244.273
2035	923.483	17.556	16.466	272.281	1,229.786	1,145.925	17.556	16.466	272.281	1,452.228	222.442	0.000	0.000	0.000	222.442
2036	951.233	17.881	16.772	266.707	1,252.594	1,374.234	17.881	16.772	266.707	1,675.594	423.000	0.000	0.000	0.000	423.000
2037	979.767	18.208	17.078	260.425	1,275.478	1,430.915	18.208	17.078	260.425	1,726.627	451.148	0.000	0.000	0.000	451.149
2038	1,009.127	18.538	17.387	253.538	1,298.591	1,442.081	18.538	17.387	253.538	1,731.545	432.954	0.000	0.000	0.000	432.954
2039	1,039.342	18.873	17.702	246.162	1,322.079	1,533.829	18.873	17.702	246.162	1,816.566	494.487	0.000	0.000	0.000	494.487
2040	1,070.428	19.217	18.024	238.456	1,346.125	1,709.059	19.217	18.024	238.456	1,984.755	638.631	0.000	0.000	0.000	638.630
2041	1,102.862	19.571	18.357	230.182	1,370.972	1,765.714	19.571	18.357	230.182	2,033.823	662.852	0.000	0.000	0.000	662.851
2042	1,135.806	19.930	18.693	221.642	1,396.070	1,857.440	19.930	18.693	221.642	2,117.705	721.634	0.000	0.000	0.000	721.635
2043	1,169.222	20.301	19.041	213.523	1,422.087	1,984.490	20.301	19.041	213.523	2,237.355	815.268	0.000	0.000	0.000	815.268
2044	1,203.458	20.693	19.408	205.971	1,449.531	1,905.108	20.693	19.408	205.971	2,151.181	701.650	0.000	0.000	0.000	701.650
2045	1,237.567	21.099	19.790	199.551	1,478.006	1,961.801	21.099	19.790	199.551	2,202.241	724.234	0.000	0.000	0.000	724.235
2046	1,272.090	21.532	20.196	194.503	1,508.321	1,956.577	21.532	20.196	194.503	2,192.808	684.487	0.000	0.000	0.000	684.487
2047	1,306.623	21.987	20.623	190.978	1,540.211	1,821.489	21.987	20.623	190.978	2,055.077	514.866	0.000	0.000	0.000	514.866
2048	1,341.078	22.464	21.070	189.012	1,573.624	2,009.235	22.464	21.070	189.012	2,241.781	668.156	0.000	0.000	0.000	668.157
2049	1,375.782	22.963	21.538	188.299	1,608.582	1,821.250	22.963	21.538	188.299	2,054.050	445.468	0.000	0.000	0.000	445.468
2050	1,410.697	23.476	22.019	188.279	1,644.470	1,711.678	23.476	22.019	188.279	1,945.451	300.981	0.000	0.000	0.000	300.981
2051	1,445.114	23.989	22.500	188.832	1,680.435	1,793.035	23.989	22.500	188.832	2,028.356	347.921	0.000	0.000	0.000	347.921
2052	1,479.004	24.502	22.981	189.844	1,716.331	1,274.516	24.502	22.981	189.844	1,511.843	-204.488	0.000	0.000	0.000	-204.488
2053	1,512.436	25.015	23.463	191.401	1,752.315	2,226.731	25.015	23.463	191.401	2,466.609	714.294	0.000	0.000	0.000	714.294
2054	1,545.815	25.536	23.951	193.499	1,788.801	2,749.545	25.536	23.951	193.499	2,992.531	1,203.730	0.000	0.000	0.000	1,203.730
2055	1,579.190	26.064	24.446	196.074	1,825.774	3,062.836	26.064	24.446	196.074	3,309.420	1,483.646	0.000	0.000	0.000	1,483.646
2056	1,612.569	26.598	24.947	199.082	1,863.196	1,939.614	26.598	24.947	199.082	2,190.241	327.045	0.000	0.000	0.000	327.045
2057	1,645.949	27.138	25.454	202.483	1,901.023	3,040.803	27.138	25.454	202.483	3,295.877	1,394.854	0.000	0.000	0.000	1,394.854
2058	1,679.319	27.683	25.965	206.223	1,939.191	2,638.360	27.683	25.965	206.223	2,898.231	959.041	0.000	0.000	0.000	959.040
2059	1,712.644	28.231	26.479	210.243	1,977.597	1,440.935	28.231	26.479	210.243	1,705.888	-271.709	0.000	0.000	0.000	-271.709
Total Contributions FY 2021-2059	\$43,347.604	\$771.831	\$723.924	\$9,188.144	\$54,031.504	\$60,247.072	\$771.831	\$723.924	\$9,188.144	\$70,930.972	\$16,899.468	\$0.000	\$0.000	\$0.000	\$16,899.468
Total Present Value FY 2021-2059¹	\$12,677.551	\$239.727	\$224.847	\$3,616.639	\$16,758.764	\$16,546.260	\$239.727	\$224.847	\$3,616.639	\$20,627.474	\$3,868.709	\$0.000	\$0.000	\$0.000	\$3,868.709

¹ In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 4 (Static Returns of 5.31%)
Based on Actuarial Valuation as of June 30, 2020

\$ in Millions															
Year Ending	June 30, 2020 Valuation Baseline							Stress Test Scenario 4							
	Projected Investment Return	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Total Required Employer Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Total Required Employer Contribution	Increase in AVA Funded Ratio		
June 30 2020		\$854.500	46.69%	45.43%					\$854.500	46.69%	45.43%				
2021	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%	5.31%	5.31%	885.894	46.04%	44.68%	3.67%	-0.65%		
2022	6.75%	944.676	45.71%	45.32%	6.64%	-0.48%	5.31%	5.31%	944.676	45.24%	44.07%	6.64%	-0.80%		
2023	6.75%	966.871	45.45%	45.38%	2.35%	-0.26%	5.31%	5.31%	976.226	44.53%	43.51%	3.34%	-0.71%		
2024	6.75%	988.997	45.50%	45.47%	2.29%	0.05%	5.31%	5.31%	1,008.063	43.99%	42.99%	3.26%	-0.54%		
2025	6.75%	1,010.868	45.60%	45.59%	2.21%	0.09%	5.31%	5.31%	1,039.992	43.49%	42.52%	3.17%	-0.50%		
2026	6.75%	1,032.573	45.73%	45.73%	2.15%	0.13%	5.31%	5.31%	1,072.125	43.03%	42.08%	3.09%	-0.45%		
2027	6.75%	1,054.243	45.90%	45.90%	2.10%	0.17%	5.31%	5.31%	1,104.603	42.62%	41.68%	3.03%	-0.41%		
2028	6.75%	1,075.735	46.09%	46.09%	2.04%	0.19%	5.31%	5.31%	1,137.313	42.26%	41.33%	2.96%	-0.37%		
2029	6.75%	1,097.009	46.31%	46.31%	1.98%	0.22%	5.31%	5.31%	1,170.173	41.94%	41.01%	2.89%	-0.32%		
2030	6.75%	1,118.560	46.56%	46.56%	1.96%	0.25%	5.31%	5.31%	1,203.760	41.65%	40.73%	2.87%	-0.28%		
2031	6.75%	1,140.529	46.86%	46.86%	1.96%	0.30%	5.31%	5.31%	1,238.267	41.44%	40.53%	2.87%	-0.21%		
2032	6.75%	1,162.518	47.20%	47.20%	1.93%	0.33%	5.31%	5.31%	1,273.274	41.28%	40.37%	2.83%	-0.16%		
2033	6.75%	1,184.677	47.56%	47.56%	1.91%	0.36%	5.31%	5.31%	1,308.985	41.16%	40.26%	2.80%	-0.12%		
2034	6.75%	1,207.164	47.96%	47.96%	1.90%	0.40%	5.31%	5.31%	1,345.599	41.09%	40.20%	2.80%	-0.07%		
2035	6.75%	1,229.786	48.40%	48.40%	1.87%	0.44%	5.31%	5.31%	1,382.965	41.08%	40.19%	2.78%	-0.01%		
2036	6.75%	1,252.594	48.88%	48.88%	1.85%	0.48%	5.31%	5.31%	1,421.173	41.13%	40.24%	2.76%	0.05%		
2037	6.75%	1,275.478	49.42%	49.42%	1.83%	0.53%	5.31%	5.31%	1,460.124	41.25%	40.36%	2.74%	0.12%		
2038	6.75%	1,298.591	50.01%	50.01%	1.81%	0.59%	5.31%	5.31%	1,500.097	41.44%	40.55%	2.74%	0.19%		
2039	6.75%	1,322.079	50.65%	50.65%	1.81%	0.65%	5.31%	5.31%	1,541.248	41.71%	40.81%	2.74%	0.27%		
2040	6.75%	1,346.125	51.36%	51.36%	1.82%	0.71%	5.31%	5.31%	1,583.997	42.06%	41.16%	2.77%	0.35%		
2041	6.75%	1,370.972	52.14%	52.14%	1.85%	0.78%	5.31%	5.31%	1,628.650	42.50%	41.59%	2.82%	0.44%		
2042	6.75%	1,396.070	52.99%	52.99%	1.83%	0.85%	5.31%	5.31%	1,674.656	43.05%	42.12%	2.82%	0.54%		
2043	6.75%	1,422.087	53.93%	53.93%	1.86%	0.94%	5.31%	5.31%	1,723.032	43.70%	42.76%	2.89%	0.65%		
2044	6.75%	1,449.531	54.96%	54.96%	1.93%	1.03%	5.31%	5.31%	1,774.452	44.47%	43.53%	2.98%	0.78%		
2045	6.75%	1,478.006	56.10%	56.10%	1.96%	1.14%	5.31%	5.31%	1,828.889	45.39%	44.43%	3.07%	0.92%		
2046	6.75%	1,508.321	57.36%	57.36%	2.05%	1.26%	5.31%	5.31%	1,887.341	46.48%	45.49%	3.20%	1.08%		
2047	6.75%	1,540.211	58.75%	58.75%	2.11%	1.39%	5.31%	5.31%	1,949.927	47.74%	46.74%	3.32%	1.27%		
2048	6.75%	1,573.624	60.28%	60.28%	2.17%	1.54%	5.31%	5.31%	2,017.140	49.22%	48.19%	3.45%	1.48%		
2049	6.75%	1,608.582	61.98%	61.98%	2.22%	1.70%	5.31%	5.31%	2,089.443	50.94%	49.87%	3.58%	1.71%		
2050	6.75%	1,644.470	63.85%	63.85%	2.23%	1.87%	5.31%	5.31%	2,166.829	52.91%	51.81%	3.70%	1.97%		
2051	6.75%	1,680.435	65.90%	65.90%	2.19%	2.05%	5.31%	5.31%	2,248.934	55.16%	54.02%	3.79%	2.25%		
2052	6.75%	1,716.331	68.14%	68.14%	2.14%	2.24%	5.31%	5.31%	2,336.996	57.72%	56.53%	3.92%	2.56%		
2053	6.75%	1,752.315	70.58%	70.58%	2.10%	2.44%	5.31%	5.31%	2,433.309	60.61%	59.37%	4.12%	2.90%		
2054	6.75%	1,788.801	73.22%	73.22%	2.08%	2.65%	5.31%	5.31%	2,540.244	63.89%	62.58%	4.39%	3.27%		
2055	6.75%	1,825.774	76.09%	76.09%	2.07%	2.86%	5.31%	5.31%	2,662.942	67.59%	66.22%	4.83%	3.70%		
2056	6.75%	1,863.196	79.18%	79.18%	2.05%	3.09%	5.31%	5.31%	2,808.434	71.80%	70.35%	5.46%	4.21%		
2057	6.75%	1,901.023	82.52%	82.52%	2.03%	3.34%	5.31%	5.31%	2,989.746	76.63%	75.09%	6.46%	4.83%		
2058	6.75%	1,939.191	86.12%	86.12%	2.01%	3.60%	5.31%	5.31%	3,239.955	82.31%	80.66%	8.37%	5.67%		
2059	6.75%	1,977.597	90.00%	90.00%	1.98%	3.88%	5.31%	5.31%	3,609.047	89.17%	87.41%	11.39%	6.87%		
Total Contributions FY 2021-2059		\$54,031.504							\$68,208.520						
Total Present Value FY 2021-2059¹		\$16,758.764							\$19,145.870						
Difference from June 30, 2020 Valuation															
Total Contributions FY 2021-2059		\$0.000							\$14,177.016						
Total Present Value FY 2021-2059¹		\$0.000							\$2,387.106						
Maximum Annual Increase					6.64%	3.88%					11.39%	6.87%			
Maximum Annual Decrease					1.81%	-0.50%					2.74%	-0.80%			

¹In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 4 (Static Returns of 5.31%)
Based on Actuarial Valuation as of June 30, 2020
Breakout of Contribution Requirements

Year Ending June 30	\$ in Millions June 30, 2020 Valuation Baseline					Stress Test Scenario 4					Difference				
	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution
	Contributions	Contributions	Contributions	P.A. 100-0465	Contribution	Contributions	Contributions	Contributions	P.A. 100-0465	Contribution	Contributions	Contributions	Contributions	P.A. 100-0465	Contribution
2020					\$854.500					\$854.500					\$0.000
2021	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$0.000	\$0.000	\$0.000	\$0.000	0.000
2022	653.694	13.486	12.649	264.848	944.676	653.694	13.486	12.649	264.848	944.676	0.000	0.000	0.000	0.000	0.000
2023	671.117	13.803	12.946	269.005	966.871	680.472	13.803	12.946	269.005	976.226	9.355	0.000	0.000	0.000	9.355
2024	689.059	14.118	13.242	272.577	988.997	708.125	14.118	13.242	272.577	1,008.063	19.066	0.000	0.000	0.000	19.066
2025	707.478	14.431	13.535	275.424	1,010.868	736.602	14.431	13.535	275.424	1,039.992	29.124	0.000	0.000	0.000	29.124
2026	726.144	14.741	13.826	277.863	1,032.573	765.696	14.741	13.826	277.863	1,072.125	39.552	0.000	0.000	0.000	39.552
2027	745.310	15.050	14.116	279.767	1,054.243	795.670	15.050	14.116	279.767	1,104.603	50.360	0.000	0.000	0.000	50.360
2028	765.039	15.357	14.404	280.936	1,075.735	826.616	15.357	14.404	280.936	1,137.313	61.577	0.000	0.000	0.000	61.577
2029	785.207	15.660	14.688	281.453	1,097.009	858.371	15.660	14.688	281.453	1,170.173	73.164	0.000	0.000	0.000	73.164
2030	806.268	15.968	14.977	281.347	1,118.560	891.468	15.968	14.977	281.347	1,203.760	85.200	0.000	0.000	0.000	85.200
2031	828.304	16.282	15.271	280.673	1,140.529	926.042	16.282	15.271	280.673	1,238.267	97.738	0.000	0.000	0.000	97.738
2032	850.883	16.596	15.565	279.473	1,162.518	961.640	16.596	15.565	279.473	1,273.274	110.756	0.000	0.000	0.000	110.756
2033	874.185	16.912	15.862	277.718	1,184.677	998.493	16.912	15.862	277.718	1,308.985	124.309	0.000	0.000	0.000	124.308
2034	898.459	17.233	16.163	275.309	1,207.164	1,036.894	17.233	16.163	275.309	1,345.599	138.435	0.000	0.000	0.000	138.435
2035	923.483	17.556	16.466	272.281	1,229.786	1,076.662	17.556	16.466	272.281	1,382.965	153.179	0.000	0.000	0.000	153.179
2036	951.233	17.881	16.772	266.707	1,252.594	1,119.812	17.881	16.772	266.707	1,421.173	168.579	0.000	0.000	0.000	168.579
2037	979.767	18.208	17.078	260.425	1,275.478	1,164.413	18.208	17.078	260.425	1,460.124	184.646	0.000	0.000	0.000	184.646
2038	1,009.127	18.538	17.387	253.538	1,298.591	1,210.633	18.538	17.387	253.538	1,500.097	201.506	0.000	0.000	0.000	201.506
2039	1,039.342	18.873	17.702	246.162	1,322.079	1,258.511	18.873	17.702	246.162	1,541.248	219.169	0.000	0.000	0.000	219.169
2040	1,070.428	19.217	18.024	238.456	1,346.125	1,308.300	19.217	18.024	238.456	1,583.997	237.872	0.000	0.000	0.000	237.872
2041	1,102.862	19.571	18.357	230.182	1,370.972	1,360.541	19.571	18.357	230.182	1,628.650	257.678	0.000	0.000	0.000	257.678
2042	1,135.806	19.930	18.693	221.642	1,396.070	1,414.391	19.930	18.693	221.642	1,674.656	278.585	0.000	0.000	0.000	278.586
2043	1,169.222	20.301	19.041	213.523	1,422.087	1,470.167	20.301	19.041	213.523	1,723.032	300.945	0.000	0.000	0.000	300.945
2044	1,203.458	20.693	19.408	205.971	1,449.531	1,528.379	20.693	19.408	205.971	1,774.452	324.921	0.000	0.000	0.000	324.921
2045	1,237.567	21.099	19.790	199.551	1,478.006	1,588.449	21.099	19.790	199.551	1,828.889	350.883	0.000	0.000	0.000	350.883
2046	1,272.090	21.532	20.196	194.503	1,508.321	1,651.110	21.532	20.196	194.503	1,887.341	379.019	0.000	0.000	0.000	379.020
2047	1,306.623	21.987	20.623	190.978	1,540.211	1,716.340	21.987	20.623	190.978	1,949.927	409.716	0.000	0.000	0.000	409.716
2048	1,341.078	22.464	21.070	189.012	1,573.624	1,784.594	22.464	21.070	189.012	2,017.140	443.516	0.000	0.000	0.000	443.516
2049	1,375.782	22.963	21.538	188.299	1,608.582	1,856.642	22.963	21.538	188.299	2,089.443	480.861	0.000	0.000	0.000	480.861
2050	1,410.697	23.476	22.019	188.279	1,644.470	1,933.056	23.476	22.019	188.279	2,166.829	522.359	0.000	0.000	0.000	522.359
2051	1,445.114	23.989	22.500	188.832	1,680.435	2,013.613	23.989	22.500	188.832	2,248.934	568.499	0.000	0.000	0.000	568.499
2052	1,479.004	24.502	22.981	189.844	1,716.331	2,099.669	24.502	22.981	189.844	2,336.996	620.665	0.000	0.000	0.000	620.665
2053	1,512.436	25.015	23.463	191.401	1,752.315	2,193.430	25.015	23.463	191.401	2,433.309	680.994	0.000	0.000	0.000	680.994
2054	1,545.815	25.536	23.951	193.499	1,788.801	2,297.258	25.536	23.951	193.499	2,540.244	751.443	0.000	0.000	0.000	751.443
2055	1,579.190	26.064	24.446	196.074	1,825.774	2,416.358	26.064	24.446	196.074	2,662.942	837.169	0.000	0.000	0.000	837.168
2056	1,612.569	26.598	24.947	199.082	1,863.196	2,557.807	26.598	24.947	199.082	2,808.434	945.238	0.000	0.000	0.000	945.238
2057	1,645.949	27.138	25.454	202.483	1,901.023	2,734.672	27.138	25.454	202.483	2,989.746	1,088.723	0.000	0.000	0.000	1,088.723
2058	1,679.319	27.683	25.965	206.223	1,939.191	2,980.084	27.683	25.965	206.223	3,239.955	1,300.765	0.000	0.000	0.000	1,300.764
2059	1,712.644	28.231	26.479	210.243	1,977.597	3,344.094	28.231	26.479	210.243	3,609.047	1,631.450	0.000	0.000	0.000	1,631.450
Total Contributions FY 2021-2059	\$43,347.604	\$771.831	\$723.924	\$9,188.144	\$54,031.504	\$57,524.620	\$771.831	\$723.924	\$9,188.144	\$68,208.520	\$14,177.016	\$0.000	\$0.000	\$0.000	\$14,177.016
Total Present Value FY 2021-2059¹	\$12,677.551	\$239.727	\$224.847	\$3,616.639	\$16,758.764	\$15,064.656	\$239.727	\$224.847	\$3,616.639	\$19,145.870	\$2,387.105	\$0.000	\$0.000	\$0.000	\$2,387.105

¹ In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 5 (Volatile Returns Averaging 5.31%)
Based on Actuarial Valuation as of June 30, 2020

\$ in Millions															
Year Ending	June 30, 2020 Valuation Baseline							Stress Test Scenario 5							
	Projected Investment Return	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Total Required Employer Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Total Required Employer Contribution	Increase in AVA Funded Ratio		
June 30 2020		\$854.500	46.69%	45.43%					\$854.500	46.69%	45.43%				
2021	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%	1.79%	1.79%	885.894	45.66%	43.18%	3.67%	-1.03%		
2022	6.75%	944.676	45.71%	45.32%	6.64%	-0.48%	3.24%	2.51%	944.676	44.25%	41.68%	6.64%	-1.41%		
2023	6.75%	966.871	45.45%	45.38%	2.35%	-0.26%	19.77%	7.97%	999.113	44.40%	46.78%	5.76%	0.15%		
2024	6.75%	988.997	45.50%	45.47%	2.29%	0.05%	15.00%	9.69%	1,044.282	45.90%	50.79%	4.52%	1.51%		
2025	6.75%	1,010.868	45.60%	45.59%	2.21%	0.09%	8.50%	9.45%	985.045	47.98%	51.91%	-5.67%	2.08%		
2026	6.75%	1,032.573	45.73%	45.73%	2.15%	0.13%	30.07%	12.64%	945.526	53.22%	63.52%	-4.01%	5.24%		
2027	6.75%	1,054.243	45.90%	45.90%	2.10%	0.17%	21.36%	13.85%	950.902	59.84%	73.05%	0.57%	6.62%		
2028	6.75%	1,075.735	46.09%	46.09%	2.04%	0.19%	17.19%	14.26%	766.877	67.13%	80.79%	-19.35%	7.28%		
2029	6.75%	1,097.009	46.31%	46.31%	1.98%	0.22%	-0.80%	12.48%	620.212	72.59%	75.21%	-19.12%	5.46%		
2030	6.75%	1,118.560	46.56%	46.56%	1.96%	0.25%	5.14%	11.72%	494.634	74.76%	73.57%	-20.25%	2.18%		
2031	6.75%	1,140.529	46.86%	46.86%	1.96%	0.30%	11.83%	11.73%	618.427	76.07%	77.01%	25.03%	1.31%		
2032	6.75%	1,162.518	47.20%	47.20%	1.93%	0.33%	17.35%	12.19%	653.624	77.57%	84.98%	5.69%	1.50%		
2033	6.75%	1,184.677	47.56%	47.56%	1.91%	0.36%	2.41%	11.41%	591.588	79.30%	81.75%	-9.49%	1.73%		
2034	6.75%	1,207.164	47.96%	47.96%	1.90%	0.40%	-8.17%	9.88%	434.005	77.90%	69.65%	-26.64%	-1.40%		
2035	6.75%	1,229.786	48.40%	48.40%	1.87%	0.44%	-7.94%	8.59%	521.235	73.30%	59.12%	20.10%	-4.59%		
2036	6.75%	1,252.594	48.88%	48.88%	1.85%	0.48%	1.88%	8.16%	801.775	66.64%	55.98%	53.82%	-6.66%		
2037	6.75%	1,275.478	49.42%	49.42%	1.83%	0.53%	-10.41%	6.97%	1,051.235	58.76%	47.06%	31.11%	-7.88%		
2038	6.75%	1,298.591	50.01%	50.01%	1.81%	0.59%	-18.16%	5.39%	1,138.634	50.59%	35.99%	8.31%	-8.17%		
2039	6.75%	1,322.079	50.65%	50.65%	1.81%	0.65%	7.60%	5.50%	1,395.492	45.13%	36.38%	22.56%	-5.47%		
2040	6.75%	1,346.125	51.36%	51.36%	1.82%	0.71%	27.63%	6.51%	1,718.606	42.88%	44.54%	23.15%	-2.25%		
2041	6.75%	1,370.972	52.14%	52.14%	1.85%	0.78%	-9.05%	5.71%	1,742.380	41.28%	39.45%	1.38%	-1.60%		
2042	6.75%	1,396.070	52.99%	52.99%	1.83%	0.85%	25.00%	6.52%	1,565.611	43.50%	46.84%	-10.15%	2.22%		
2043	6.75%	1,422.087	53.93%	53.93%	1.86%	0.94%	-0.99%	6.18%	1,798.665	45.84%	45.13%	14.89%	2.34%		
2044	6.75%	1,449.531	54.96%	54.96%	1.93%	1.03%	14.87%	6.53%	1,614.509	46.99%	49.59%	-10.24%	1.16%		
2045	6.75%	1,478.006	56.10%	56.10%	1.96%	1.14%	24.37%	7.19%	1,763.081	52.29%	59.54%	9.20%	5.29%		
2046	6.75%	1,508.321	57.36%	57.36%	2.05%	1.26%	-5.35%	6.68%	1,674.203	54.36%	54.61%	-5.04%	2.08%		
2047	6.75%	1,540.211	58.75%	58.75%	2.11%	1.39%	15.62%	7.00%	1,390.127	57.63%	60.02%	-16.97%	3.27%		
2048	6.75%	1,573.624	60.28%	60.28%	2.17%	1.54%	18.81%	7.40%	1,703.665	62.89%	68.93%	22.55%	5.26%		
2049	6.75%	1,608.582	61.98%	61.98%	2.22%	1.70%	1.10%	7.18%	1,536.261	65.04%	67.20%	-9.83%	2.15%		
2050	6.75%	1,644.470	63.85%	63.85%	2.23%	1.87%	-9.90%	6.56%	1,235.895	65.35%	57.50%	-19.55%	0.31%		
2051	6.75%	1,680.435	65.90%	65.90%	2.19%	2.05%	10.74%	6.69%	1,461.295	65.58%	60.76%	18.24%	0.23%		
2052	6.75%	1,716.331	68.14%	68.14%	2.14%	2.24%	7.80%	6.73%	2,123.921	65.99%	64.43%	45.35%	0.42%		
2053	6.75%	1,752.315	70.58%	70.58%	2.10%	2.44%	3.60%	6.63%	2,022.913	66.43%	65.45%	-4.76%	0.44%		
2054	6.75%	1,788.801	73.22%	73.22%	2.08%	2.65%	3.75%	6.55%	2,018.696	68.94%	66.53%	-0.21%	2.51%		
2055	6.75%	1,825.774	76.09%	76.09%	2.07%	2.86%	-2.03%	6.29%	2,235.934	70.29%	64.49%	10.76%	1.36%		
2056	6.75%	1,863.196	79.18%	79.18%	2.05%	3.09%	-6.23%	5.92%	2,490.562	70.21%	60.55%	11.39%	-0.09%		
2057	6.75%	1,901.023	82.52%	82.52%	2.03%	3.34%	4.10%	5.87%	3,347.356	72.34%	65.09%	34.40%	2.13%		
2058	6.75%	1,939.191	86.12%	86.12%	2.01%	3.60%	-10.62%	5.40%	5,083.536	76.83%	65.16%	51.87%	4.49%		
2059	6.75%	1,977.597	90.00%	90.00%	1.98%	3.88%	2.08%	5.31%	5,662.039	83.55%	74.59%	11.38%	6.72%		
Total Contributions FY 2021-2059		\$54,031.504							\$60,032.431						
Total Present Value FY 2021-2059¹		\$16,758.764							\$15,521.300						
Difference from June 30, 2020 Valuation															
Total Contributions FY 2021-2059		\$0.000							\$6,000.927						
Total Present Value FY 2021-2059¹		\$0.000							-\$1,237.464						
Maximum Annual Increase					6.64%	3.88%					53.82%	7.28%			
Maximum Annual Decrease					1.81%	-0.50%					-26.64%	-8.17%			

¹In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 5 (Volatile Returns Averaging 5.31%)
Based on Actuarial Valuation as of June 30, 2020
Breakout of Contribution Requirements

Year Ending June 30	\$ in Millions														
	June 30, 2020 Valuation Baseline					Stress Test Scenario 5					Difference				
	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution
	Contributions	Contributions	Contributions	P.A. 100-0465	Contribution	Contributions	Contributions	Contributions	P.A. 100-0465	Contribution	Contributions	Contributions	Contributions	P.A. 100-0465	Contribution
2020					\$854.500					\$854.500					\$0.000
2021	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$0.000	\$0.000	\$0.000	\$0.000	0.000
2022	653.694	13.486	12.649	264.848	944.676	653.694	13.486	12.649	264.848	944.676	0.000	0.000	0.000	0.000	0.000
2023	671.117	13.803	12.946	269.005	966.871	703.359	13.803	12.946	269.005	999.113	32.242	0.000	0.000	0.000	32.242
2024	689.059	14.118	13.242	272.577	988.997	744.344	14.118	13.242	272.577	1,044.282	55.285	0.000	0.000	0.000	55.285
2025	707.478	14.431	13.535	275.424	1,010.868	681.655	14.431	13.535	275.424	985.045	-25.823	0.000	0.000	0.000	-25.823
2026	726.144	14.741	13.826	277.863	1,032.573	639.097	14.741	13.826	277.863	945.526	-87.047	0.000	0.000	0.000	-87.047
2027	745.310	15.050	14.116	279.767	1,054.243	641.969	15.050	14.116	279.767	950.902	-103.341	0.000	0.000	0.000	-103.341
2028	765.039	15.357	14.404	280.936	1,075.735	456.180	15.357	14.404	280.936	766.877	-308.858	0.000	0.000	0.000	-308.858
2029	785.207	15.660	14.688	281.453	1,097.009	308.410	15.660	14.688	281.453	620.212	-476.797	0.000	0.000	0.000	-476.797
2030	806.268	15.968	14.977	281.347	1,118.560	182.342	15.968	14.977	281.347	494.634	-623.926	0.000	0.000	0.000	-623.926
2031	828.304	16.282	15.271	280.673	1,140.529	306.201	16.282	15.271	280.673	618.427	-522.103	0.000	0.000	0.000	-522.103
2032	850.883	16.596	15.565	279.473	1,162.518	341.990	16.596	15.565	279.473	653.624	-508.894	0.000	0.000	0.000	-508.894
2033	874.185	16.912	15.862	277.718	1,184.677	281.096	16.912	15.862	277.718	591.588	-593.088	0.000	0.000	0.000	-593.088
2034	898.459	17.233	16.163	275.309	1,207.164	125.300	17.233	16.163	275.309	434.005	-773.159	0.000	0.000	0.000	-773.159
2035	923.483	17.556	16.466	272.281	1,229.786	214.932	17.556	16.466	272.281	521.235	-708.551	0.000	0.000	0.000	-708.551
2036	951.233	17.881	16.772	266.707	1,252.594	500.415	17.881	16.772	266.707	801.775	-450.818	0.000	0.000	0.000	-450.818
2037	979.767	18.208	17.078	260.425	1,275.478	755.524	18.208	17.078	260.425	1,051.235	-224.243	0.000	0.000	0.000	-224.243
2038	1,009.127	18.538	17.387	253.538	1,298.591	849.170	18.538	17.387	253.538	1,138.634	-159.957	0.000	0.000	0.000	-159.957
2039	1,039.342	18.873	17.702	246.162	1,322.079	1,112.754	18.873	17.702	246.162	1,395.492	73.412	0.000	0.000	0.000	73.412
2040	1,070.428	19.217	18.024	238.456	1,346.125	1,442.909	19.217	18.024	238.456	1,718.606	372.481	0.000	0.000	0.000	372.481
2041	1,102.862	19.571	18.357	230.182	1,370.972	1,474.271	19.571	18.357	230.182	1,742.380	371.409	0.000	0.000	0.000	371.408
2042	1,135.806	19.930	18.693	221.642	1,396.070	1,305.346	19.930	18.693	221.642	1,565.611	169.541	0.000	0.000	0.000	169.541
2043	1,169.222	20.301	19.041	213.523	1,422.087	1,545.799	20.301	19.041	213.523	1,798.665	376.578	0.000	0.000	0.000	376.578
2044	1,203.458	20.693	19.408	205.971	1,449.531	1,368.436	20.693	19.408	205.971	1,614.509	164.978	0.000	0.000	0.000	164.978
2045	1,237.567	21.099	19.790	199.551	1,478.006	1,522.641	21.099	19.790	199.551	1,763.081	285.074	0.000	0.000	0.000	285.075
2046	1,272.090	21.532	20.196	194.503	1,508.321	1,437.972	21.532	20.196	194.503	1,674.203	165.881	0.000	0.000	0.000	165.882
2047	1,306.623	21.987	20.623	190.978	1,540.211	1,156.540	21.987	20.623	190.978	1,390.127	-150.083	0.000	0.000	0.000	-150.084
2048	1,341.078	22.464	21.070	189.012	1,573.624	1,471.119	22.464	21.070	189.012	1,703.665	130.041	0.000	0.000	0.000	130.041
2049	1,375.782	22.963	21.538	188.299	1,608.582	1,303.460	22.963	21.538	188.299	1,536.261	-72.321	0.000	0.000	0.000	-72.321
2050	1,410.697	23.476	22.019	188.279	1,644.470	1,002.122	23.476	22.019	188.279	1,235.895	-408.576	0.000	0.000	0.000	-408.575
2051	1,445.114	23.989	22.500	188.832	1,680.435	1,225.974	23.989	22.500	188.832	1,461.295	-219.141	0.000	0.000	0.000	-219.140
2052	1,479.004	24.502	22.981	189.844	1,716.331	1,886.595	24.502	22.981	189.844	2,123.921	407.591	0.000	0.000	0.000	407.590
2053	1,512.436	25.015	23.463	191.401	1,752.315	1,783.034	25.015	23.463	191.401	2,022.913	270.598	0.000	0.000	0.000	270.598
2054	1,545.815	25.536	23.951	193.499	1,788.801	1,775.710	25.536	23.951	193.499	2,018.696	229.895	0.000	0.000	0.000	229.895
2055	1,579.190	26.064	24.446	196.074	1,825.774	1,989.350	26.064	24.446	196.074	2,235.934	410.160	0.000	0.000	0.000	410.160
2056	1,612.569	26.598	24.947	199.082	1,863.196	2,239.935	26.598	24.947	199.082	2,490.562	627.366	0.000	0.000	0.000	627.366
2057	1,645.949	27.138	25.454	202.483	1,901.023	3,092.281	27.138	25.454	202.483	3,347.356	1,446.333	0.000	0.000	0.000	1,446.333
2058	1,679.319	27.683	25.965	206.223	1,939.191	4,823.665	27.683	25.965	206.223	5,083.536	3,144.345	0.000	0.000	0.000	3,144.345
2059	1,712.644	28.231	26.479	210.243	1,977.597	5,397.086	28.231	26.479	210.243	5,662.039	3,684.442	0.000	0.000	0.000	3,684.442
Total Contributions FY 2021-2059	\$43,347.604	\$771.831	\$723.924	\$9,188.144	\$54,031.504	\$49,348.531	\$771.831	\$723.924	\$9,188.144	\$60,032.431	\$6,000.927	\$0.000	\$0.000	\$0.000	\$6,000.927
Total Present Value FY 2021-2059¹	\$12,677.551	\$239.727	\$224.847	\$3,616.639	\$16,758.764	\$11,440.087	\$239.727	\$224.847	\$3,616.639	\$15,521.300	-\$1,237.464	\$0.000	\$0.000	\$0.000	-\$1,237.464

¹ In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago Comparison of Actuarial Valuation Results and Stress Testing Scenario 6 (Static Returns of 0.00%) Based on Actuarial Valuation as of June 30, 2020

\$ in Millions														
Year Ending June 30	June 30, 2020 Valuation Baseline							Stress Test Scenario 6						
	Projected Investment Return	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in		Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in		
					Total Required Employer Contribution	Increase in AVA Funded Ratio						Total Required Employer Contribution	Increase in AVA Funded Ratio	
2020		\$854.500	46.69%	45.43%					\$854.500	46.69%	45.43%			
2021	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%	0.00%	0.00%	885.894	45.47%	42.41%	3.67%	-1.22%	
2022	6.75%	944.676	45.71%	45.32%	6.64%	-0.48%	0.00%	0.00%	944.676	43.54%	39.62%	6.64%	-1.93%	
2023	6.75%	966.871	45.45%	45.38%	2.35%	-0.26%	0.00%	0.00%	1,010.734	41.27%	37.07%	6.99%	-2.27%	
2024	6.75%	988.997	45.50%	45.47%	2.29%	0.05%	0.00%	0.00%	1,075.940	38.76%	34.76%	6.45%	-2.51%	
2025	6.75%	1,010.868	45.60%	45.59%	2.21%	0.09%	0.00%	0.00%	1,140.118	36.43%	32.65%	5.96%	-2.33%	
2026	6.75%	1,032.573	45.73%	45.73%	2.15%	0.13%	0.00%	0.00%	1,203.411	34.30%	30.75%	5.55%	-2.13%	
2027	6.75%	1,054.243	45.90%	45.90%	2.10%	0.17%	0.00%	0.00%	1,266.038	32.37%	29.05%	5.20%	-1.93%	
2028	6.75%	1,075.735	46.09%	46.09%	2.04%	0.19%	0.00%	0.00%	1,327.891	30.63%	27.51%	4.89%	-1.73%	
2029	6.75%	1,097.009	46.31%	46.31%	1.98%	0.22%	0.00%	0.00%	1,389.063	29.09%	26.15%	4.61%	-1.55%	
2030	6.75%	1,118.560	46.56%	46.56%	1.96%	0.25%	0.00%	0.00%	1,450.221	27.71%	24.93%	4.40%	-1.38%	
2031	6.75%	1,140.529	46.86%	46.86%	1.96%	0.30%	0.00%	0.00%	1,511.696	26.53%	23.90%	4.24%	-1.18%	
2032	6.75%	1,162.518	47.20%	47.20%	1.93%	0.33%	0.00%	0.00%	1,573.110	25.51%	23.01%	4.06%	-1.02%	
2033	6.75%	1,184.677	47.56%	47.56%	1.91%	0.36%	0.00%	0.00%	1,634.806	24.64%	22.25%	3.92%	-0.87%	
2034	6.75%	1,207.164	47.96%	47.96%	1.90%	0.40%	0.00%	0.00%	1,697.156	23.91%	21.62%	3.81%	-0.73%	
2035	6.75%	1,229.786	48.40%	48.40%	1.87%	0.44%	0.00%	0.00%	1,760.112	23.32%	21.11%	3.71%	-0.59%	
2036	6.75%	1,252.594	48.88%	48.88%	1.85%	0.48%	0.00%	0.00%	1,823.861	22.87%	20.73%	3.62%	-0.45%	
2037	6.75%	1,275.478	49.42%	49.42%	1.83%	0.53%	0.00%	0.00%	1,888.383	22.56%	20.47%	3.54%	-0.31%	
2038	6.75%	1,298.591	50.01%	50.01%	1.81%	0.59%	0.00%	0.00%	1,954.172	22.38%	20.33%	3.48%	-0.18%	
2039	6.75%	1,322.079	50.65%	50.65%	1.81%	0.65%	0.00%	0.00%	2,021.692	22.34%	20.32%	3.46%	-0.04%	
2040	6.75%	1,346.125	51.36%	51.36%	1.82%	0.71%	0.00%	0.00%	2,091.495	22.44%	20.43%	3.45%	0.10%	
2041	6.75%	1,370.972	52.14%	52.14%	1.85%	0.78%	0.00%	0.00%	2,164.325	22.68%	20.67%	3.48%	0.24%	
2042	6.75%	1,396.070	52.99%	52.99%	1.83%	0.85%	0.00%	0.00%	2,239.664	23.06%	21.04%	3.48%	0.39%	
2043	6.75%	1,422.087	53.93%	53.93%	1.86%	0.94%	0.00%	0.00%	2,318.952	23.61%	21.55%	3.54%	0.54%	
2044	6.75%	1,449.531	54.96%	54.96%	1.93%	1.03%	0.00%	0.00%	2,403.705	24.33%	22.23%	3.65%	0.72%	
2045	6.75%	1,478.006	56.10%	56.10%	1.96%	1.14%	0.00%	0.00%	2,494.019	25.24%	23.08%	3.76%	0.91%	
2046	6.75%	1,508.321	57.36%	57.36%	2.05%	1.26%	0.00%	0.00%	2,591.836	26.38%	24.14%	3.92%	1.13%	
2047	6.75%	1,540.211	58.75%	58.75%	2.11%	1.39%	0.00%	0.00%	2,698.210	27.76%	25.42%	4.10%	1.38%	
2048	6.75%	1,573.624	60.28%	60.28%	2.17%	1.54%	0.00%	0.00%	2,814.193	29.42%	26.96%	4.30%	1.67%	
2049	6.75%	1,608.582	61.98%	61.98%	2.22%	1.70%	0.00%	0.00%	2,941.932	31.41%	28.80%	4.54%	1.98%	
2050	6.75%	1,644.470	63.85%	63.85%	2.23%	1.87%	0.00%	0.00%	3,082.503	33.74%	30.95%	4.78%	2.34%	
2051	6.75%	1,680.435	65.90%	65.90%	2.19%	2.05%	0.00%	0.00%	3,237.941	36.47%	33.47%	5.04%	2.73%	
2052	6.75%	1,716.331	68.14%	68.14%	2.14%	2.24%	0.00%	0.00%	3,411.889	39.63%	36.38%	5.37%	3.16%	
2053	6.75%	1,752.315	70.58%	70.58%	2.10%	2.44%	0.00%	0.00%	3,611.149	43.29%	39.74%	5.84%	3.66%	
2054	6.75%	1,788.801	73.22%	73.22%	2.08%	2.65%	0.00%	0.00%	3,846.419	47.53%	43.65%	6.52%	4.24%	
2055	6.75%	1,825.774	76.09%	76.09%	2.07%	2.86%	0.00%	0.00%	4,132.351	52.49%	48.22%	7.43%	4.96%	
2056	6.75%	1,863.196	79.18%	79.18%	2.05%	3.09%	0.00%	0.00%	4,495.710	58.37%	53.65%	8.79%	5.88%	
2057	6.75%	1,901.023	82.52%	82.52%	2.03%	3.34%	0.00%	0.00%	4,987.231	65.51%	60.26%	10.93%	7.14%	
2058	6.75%	1,939.191	86.12%	86.12%	2.01%	3.60%	0.00%	0.00%	5,728.441	74.59%	68.70%	14.86%	9.08%	
2059	6.75%	1,977.597	90.00%	90.00%	1.98%	3.88%	0.00%	0.00%	6,917.934	86.83%	80.14%	20.76%	12.24%	
Total Contributions FY 2021-2059		\$54,031.504							\$95,768.873					
Total Present Value FY 2021-2059¹		\$16,758.764							\$24,209.648					
Difference from June 30, 2020 Valuation														
Total Contributions FY 2021-2059		\$0.000							\$41,737.369					
Total Present Value FY 2021-2059¹		\$0.000							\$7,450.884					
Maximum Annual Increase					6.64%	3.88%						20.76%	12.24%	
Maximum Annual Decrease					1.81%	-0.50%						3.45%	-2.51%	

¹In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



**Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 6 (Static Returns of 0.00%)
Based on Actuarial Valuation as of June 30, 2020
Breakout of Contribution Requirements**

Year Ending June 30	\$ in Millions										Difference				
	June 30, 2020 Valuation Baseline					Stress Test Scenario 6									
	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer
2020					\$854.500					\$854.500					\$0.000
2021	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$0.000	\$0.000	\$0.000	\$0.000	0.000
2022	653.694	13.486	12.649	264.848	944.676	653.694	13.486	12.649	264.848	944.676	0.000	0.000	0.000	0.000	0.000
2023	671.117	13.803	12.946	269.005	966.871	714.980	13.803	12.946	269.005	1,010.734	43.863	0.000	0.000	0.000	43.863
2024	689.059	14.118	13.242	272.577	988.997	776.002	14.118	13.242	272.577	1,075.940	86.943	0.000	0.000	0.000	86.943
2025	707.478	14.431	13.535	275.424	1,010.868	836.728	14.431	13.535	275.424	1,140.118	129.251	0.000	0.000	0.000	129.250
2026	726.144	14.741	13.826	277.863	1,032.573	896.982	14.741	13.826	277.863	1,203.411	170.838	0.000	0.000	0.000	170.838
2027	745.310	15.050	14.116	279.767	1,054.243	957.105	15.050	14.116	279.767	1,266.038	211.795	0.000	0.000	0.000	211.795
2028	765.039	15.357	14.404	280.936	1,075.735	1,017.195	15.357	14.404	280.936	1,327.891	252.156	0.000	0.000	0.000	252.156
2029	785.207	15.660	14.688	281.453	1,097.009	1,077.261	15.660	14.688	281.453	1,389.063	292.054	0.000	0.000	0.000	292.054
2030	806.268	15.968	14.977	281.347	1,118.560	1,137.929	15.968	14.977	281.347	1,450.221	331.661	0.000	0.000	0.000	331.661
2031	828.304	16.282	15.271	280.673	1,140.529	1,199.471	16.282	15.271	280.673	1,511.696	371.167	0.000	0.000	0.000	371.167
2032	850.883	16.596	15.565	279.473	1,162.518	1,261.475	16.596	15.565	279.473	1,573.110	410.592	0.000	0.000	0.000	410.592
2033	874.185	16.912	15.862	277.718	1,184.677	1,324.314	16.912	15.862	277.718	1,634.806	450.130	0.000	0.000	0.000	450.129
2034	898.459	17.233	16.163	275.309	1,207.164	1,388.451	17.233	16.163	275.309	1,697.156	489.992	0.000	0.000	0.000	489.992
2035	923.483	17.556	16.466	272.281	1,229.786	1,453.809	17.556	16.466	272.281	1,760.112	530.326	0.000	0.000	0.000	530.326
2036	951.233	17.881	16.772	266.707	1,252.594	1,522.500	17.881	16.772	266.707	1,823.861	571.267	0.000	0.000	0.000	571.267
2037	979.767	18.208	17.078	260.425	1,275.478	1,592.672	18.208	17.078	260.425	1,888.383	612.905	0.000	0.000	0.000	612.905
2038	1,009.127	18.538	17.387	253.538	1,298.591	1,664.709	18.538	17.387	253.538	1,954.172	655.582	0.000	0.000	0.000	655.581
2039	1,039.342	18.873	17.702	246.162	1,322.079	1,738.955	18.873	17.702	246.162	2,021.692	699.612	0.000	0.000	0.000	699.613
2040	1,070.428	19.217	18.024	238.456	1,346.125	1,815.798	19.217	18.024	238.456	2,091.495	745.370	0.000	0.000	0.000	745.370
2041	1,102.862	19.571	18.357	230.182	1,370.972	1,896.216	19.571	18.357	230.182	2,164.325	793.353	0.000	0.000	0.000	793.353
2042	1,135.806	19.930	18.693	221.642	1,396.070	1,979.400	19.930	18.693	221.642	2,239.664	843.594	0.000	0.000	0.000	843.594
2043	1,169.222	20.301	19.041	213.523	1,422.087	2,066.087	20.301	19.041	213.523	2,318.952	896.865	0.000	0.000	0.000	896.865
2044	1,203.458	20.693	19.408	205.971	1,449.531	2,157.632	20.693	19.408	205.971	2,403.705	954.174	0.000	0.000	0.000	954.174
2045	1,237.567	21.099	19.790	199.551	1,478.006	2,253.579	21.099	19.790	199.551	2,494.019	1,016.013	0.000	0.000	0.000	1,016.013
2046	1,272.090	21.532	20.196	194.503	1,508.321	2,355.605	21.532	20.196	194.503	2,594.836	1,083.515	0.000	0.000	0.000	1,083.515
2047	1,306.623	21.987	20.623	190.978	1,540.211	2,464.622	21.987	20.623	190.978	2,698.210	1,157.999	0.000	0.000	0.000	1,157.999
2048	1,341.078	22.464	21.070	189.012	1,573.624	2,581.647	22.464	21.070	189.012	2,814.193	1,240.569	0.000	0.000	0.000	1,240.569
2049	1,375.782	22.963	21.538	188.299	1,608.582	2,709.131	22.963	21.538	188.299	2,941.932	1,333.350	0.000	0.000	0.000	1,333.350
2050	1,410.697	23.476	22.019	188.279	1,644.470	2,848.730	23.476	22.019	188.279	3,082.503	1,438.033	0.000	0.000	0.000	1,438.033
2051	1,445.114	23.989	22.500	188.832	1,680.435	3,002.620	23.989	22.500	188.832	3,237.941	1,557.506	0.000	0.000	0.000	1,557.506
2052	1,479.004	24.502	22.981	189.844	1,716.331	3,174.562	24.502	22.981	189.844	3,411.889	1,695.558	0.000	0.000	0.000	1,695.558
2053	1,512.436	25.015	23.463	191.401	1,752.315	3,371.271	25.015	23.463	191.401	3,611.149	1,858.834	0.000	0.000	0.000	1,858.834
2054	1,545.815	25.536	23.951	193.499	1,788.801	3,603.433	25.536	23.951	193.499	3,846.419	2,057.618	0.000	0.000	0.000	2,057.618
2055	1,579.190	26.064	24.446	196.074	1,825.774	3,885.767	26.064	24.446	196.074	4,132.351	2,306.577	0.000	0.000	0.000	2,306.577
2056	1,612.569	26.598	24.947	199.082	1,863.196	4,245.083	26.598	24.947	199.082	4,495.710	2,632.514	0.000	0.000	0.000	2,632.514
2057	1,645.949	27.138	25.454	202.483	1,901.023	4,732.157	27.138	25.454	202.483	4,987.231	3,086.208	0.000	0.000	0.000	3,086.208
2058	1,679.319	27.683	25.965	206.223	1,939.191	5,468.570	27.683	25.965	206.223	5,728.441	3,789.250	0.000	0.000	0.000	3,789.250
2059	1,712.644	28.231	26.479	210.243	1,977.597	6,652.982	28.231	26.479	210.243	6,917.934	4,940.337	0.000	0.000	0.000	4,940.337
Total Contributions FY 2021-2059	\$43,347.604	\$771.831	\$723.924	\$9,188.144	\$54,031.504	\$85,084.974	\$771.831	\$723.924	\$9,188.144	\$95,768.873	\$41,737.370	\$0.000	\$0.000	\$0.000	\$41,737.369
Total Present Value FY 2021-2059¹	\$12,677.551	\$239.727	\$224.847	\$3,616.639	\$16,758.764	\$20,128.435	\$239.727	\$224.847	\$3,616.639	\$24,209.648	\$7,450.884	\$0.000	\$0.000	\$0.000	\$7,450.884

¹ In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 7 (Population Decreases 1% Per Year for 10 years)
Based on Actuarial Valuation as of June 30, 2020

\$ in Millions															
	June 30, 2020 Valuation Baseline							Stress Test Scenario 7							
	Projected Investment Return	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in Total Required Employer Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total Required Employer Contribution	Actuarial Value of Assets (AVA) Funded Ratio	Market Value of Assets (MVA) Funded Ratio	Increase in Total Required Employer Contribution	Increase in AVA Funded Ratio		
Year Ending June 30 2020		\$854.500	46.69%	45.43%					\$854.500	46.69%	45.43%				
2021	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%	6.75%	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%		
2022	6.75%	944.676	45.71%	45.32%	6.64%	-0.48%	6.75%	6.75%	938.450	45.68%	45.30%	5.93%	-0.51%		
2023	6.75%	966.871	45.45%	45.38%	2.35%	-0.26%	6.75%	6.75%	1,025.474	45.65%	45.58%	9.27%	-0.03%		
2024	6.75%	988.997	45.50%	45.47%	2.29%	0.05%	6.75%	6.75%	1,041.621	45.91%	45.87%	1.57%	0.26%		
2025	6.75%	1,010.868	45.60%	45.59%	2.21%	0.09%	6.75%	6.75%	1,057.013	46.18%	46.17%	1.48%	0.28%		
2026	6.75%	1,032.573	45.73%	45.73%	2.15%	0.13%	6.75%	6.75%	1,071.741	46.48%	46.48%	1.39%	0.30%		
2027	6.75%	1,054.243	45.90%	45.90%	2.10%	0.17%	6.75%	6.75%	1,085.930	46.79%	46.79%	1.32%	0.31%		
2028	6.75%	1,075.735	46.09%	46.09%	2.04%	0.19%	6.75%	6.75%	1,099.419	47.09%	47.09%	1.24%	0.31%		
2029	6.75%	1,097.009	46.31%	46.31%	1.98%	0.22%	6.75%	6.75%	1,112.126	47.40%	47.40%	1.16%	0.31%		
2030	6.75%	1,118.560	46.56%	46.56%	1.96%	0.25%	6.75%	6.75%	1,124.586	47.70%	47.70%	1.12%	0.30%		
2031	6.75%	1,140.529	46.86%	46.86%	1.96%	0.30%	6.75%	6.75%	1,136.962	48.02%	48.02%	1.10%	0.32%		
2032	6.75%	1,162.518	47.20%	47.20%	1.93%	0.33%	6.75%	6.75%	1,156.683	48.36%	48.36%	1.73%	0.35%		
2033	6.75%	1,184.677	47.56%	47.56%	1.91%	0.36%	6.75%	6.75%	1,176.524	48.73%	48.73%	1.72%	0.37%		
2034	6.75%	1,207.164	47.96%	47.96%	1.90%	0.40%	6.75%	6.75%	1,196.641	49.13%	49.13%	1.71%	0.40%		
2035	6.75%	1,229.786	48.40%	48.40%	1.87%	0.44%	6.75%	6.75%	1,216.814	49.56%	49.56%	1.69%	0.43%		
2036	6.75%	1,252.594	48.88%	48.88%	1.85%	0.48%	6.75%	6.75%	1,237.087	50.03%	50.03%	1.67%	0.47%		
2037	6.75%	1,275.478	49.42%	49.42%	1.83%	0.53%	6.75%	6.75%	1,257.350	50.54%	50.54%	1.64%	0.51%		
2038	6.75%	1,298.591	50.01%	50.01%	1.81%	0.59%	6.75%	6.75%	1,277.767	51.10%	51.10%	1.62%	0.56%		
2039	6.75%	1,322.079	50.65%	50.65%	1.81%	0.65%	6.75%	6.75%	1,298.501	51.71%	51.71%	1.62%	0.61%		
2040	6.75%	1,346.125	51.36%	51.36%	1.82%	0.71%	6.75%	6.75%	1,319.764	52.37%	52.37%	1.64%	0.66%		
2041	6.75%	1,370.972	52.14%	52.14%	1.85%	0.78%	6.75%	6.75%	1,341.835	53.10%	53.10%	1.67%	0.73%		
2042	6.75%	1,396.070	52.99%	52.99%	1.83%	0.85%	6.75%	6.75%	1,364.162	53.89%	53.89%	1.66%	0.79%		
2043	6.75%	1,422.087	53.93%	53.93%	1.86%	0.94%	6.75%	6.75%	1,387.475	54.76%	54.76%	1.71%	0.87%		
2044	6.75%	1,449.531	54.96%	54.96%	1.93%	1.03%	6.75%	6.75%	1,412.336	55.72%	55.72%	1.79%	0.96%		
2045	6.75%	1,478.006	56.10%	56.10%	1.96%	1.14%	6.75%	6.75%	1,438.351	56.78%	56.78%	1.84%	1.06%		
2046	6.75%	1,508.321	57.36%	57.36%	2.05%	1.26%	6.75%	6.75%	1,466.387	57.95%	57.95%	1.95%	1.17%		
2047	6.75%	1,540.211	58.75%	58.75%	2.11%	1.39%	6.75%	6.75%	1,496.157	59.25%	59.25%	2.03%	1.30%		
2048	6.75%	1,573.624	60.28%	60.28%	2.17%	1.54%	6.75%	6.75%	1,527.624	60.70%	60.70%	2.10%	1.45%		
2049	6.75%	1,608.582	61.98%	61.98%	2.22%	1.70%	6.75%	6.75%	1,560.802	62.31%	62.31%	2.17%	1.61%		
2050	6.75%	1,644.470	63.85%	63.85%	2.23%	1.87%	6.75%	6.75%	1,595.048	64.09%	64.09%	2.19%	1.78%		
2051	6.75%	1,680.435	65.90%	65.90%	2.19%	2.05%	6.75%	6.75%	1,629.459	66.06%	66.06%	2.16%	1.97%		
2052	6.75%	1,716.331	68.14%	68.14%	2.14%	2.24%	6.75%	6.75%	1,663.911	68.23%	68.23%	2.11%	2.16%		
2053	6.75%	1,752.315	70.58%	70.58%	2.10%	2.44%	6.75%	6.75%	1,698.553	70.60%	70.60%	2.08%	2.37%		
2054	6.75%	1,788.801	73.22%	73.22%	2.08%	2.65%	6.75%	6.75%	1,733.822	73.19%	73.19%	2.08%	2.59%		
2055	6.75%	1,825.774	76.09%	76.09%	2.07%	2.86%	6.75%	6.75%	1,769.701	76.01%	76.01%	2.07%	2.82%		
2056	6.75%	1,863.196	79.18%	79.18%	2.05%	3.09%	6.75%	6.75%	1,806.149	79.09%	79.09%	2.06%	3.07%		
2057	6.75%	1,901.023	82.52%	82.52%	2.03%	3.34%	6.75%	6.75%	1,843.119	82.43%	82.43%	2.05%	3.34%		
2058	6.75%	1,939.191	86.12%	86.12%	2.01%	3.60%	6.75%	6.75%	1,880.546	86.06%	86.06%	2.03%	3.63%		
2059	6.75%	1,977.597	90.00%	90.00%	1.98%	3.88%	6.75%	6.75%	1,918.328	90.00%	90.00%	2.01%	3.95%		
Total Contributions FY 2021-2059		\$54,031.504							\$53,250.112						
Total Present Value FY 2021-2059¹		\$16,758.764							\$16,772.874						
Difference from June 30, 2020 Valuation															
Total Contributions FY 2021-2059		\$0.000							-\$781.392						
Total Present Value FY 2021-2059¹		\$0.000							\$14.110						
Maximum Annual Increase					6.64%	3.88%						9.27%	3.95%		
Maximum Annual Decrease					1.81%	-0.50%						1.10%	-0.51%		

¹In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago

Comparison of Actuarial Valuation Results and Stress Testing Scenario 7 (Population Decreases 1% Per Year for 10 years)

Based on Actuarial Valuation as of June 30, 2020

Breakout of Contribution Requirements

Year Ending June 30	\$ in Millions					\$ in Millions					Difference				
	June 30, 2020 Valuation Baseline					Stress Test Scenario 7					Difference				
	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution
2020					\$854.500					\$854.500					\$0.000
2021	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$0.000	\$0.000	\$0.000	\$0.000	0.000
2022	653.694	13.486	12.649	264.848	944.676	647.387	13.397	12.565	265.100	938.450	-6.306	-0.089	-0.083	0.253	-6.226
2023	671.117	13.803	12.946	269.005	966.871	729.598	13.619	12.773	269.484	1,025.474	58.481	-0.184	-0.173	0.479	58.603
2024	689.059	14.118	13.242	272.577	988.997	741.530	13.833	12.974	273.283	1,041.621	52.471	-0.285	-0.268	0.706	52.624
2025	707.478	14.431	13.535	275.424	1,010.868	753.445	14.037	13.166	276.364	1,057.013	45.968	-0.393	-0.369	0.939	46.145
2026	726.144	14.741	13.826	277.863	1,032.573	765.129	14.233	13.350	279.030	1,071.741	38.984	-0.507	-0.476	1.167	39.168
2027	745.310	15.050	14.116	279.767	1,054.243	776.822	14.422	13.526	281.160	1,085.930	31.512	-0.628	-0.589	1.393	31.687
2028	765.039	15.357	14.404	280.936	1,075.735	788.577	14.601	13.694	282.547	1,099.419	23.538	-0.756	-0.709	1.611	23.684
2029	785.207	15.660	14.688	281.453	1,097.009	800.238	14.769	13.853	283.266	1,112.126	15.030	-0.891	-0.836	1.813	15.117
2030	806.268	15.968	14.977	281.347	1,118.560	812.303	14.935	14.008	283.341	1,124.586	6.034	-1.033	-0.969	1.994	6.026
2031	828.304	16.282	15.271	280.673	1,140.529	824.869	15.099	14.162	282.833	1,136.962	-3.435	-1.182	-1.109	2.160	-3.567
2032	850.883	16.596	15.565	279.473	1,162.518	845.428	15.361	14.408	281.485	1,156.683	-5.455	-1.234	-1.158	2.012	-5.835
2033	874.185	16.912	15.862	277.718	1,184.677	866.647	15.625	14.655	279.597	1,176.524	-7.537	-1.287	-1.207	1.879	-8.153
2034	898.459	17.233	16.163	275.309	1,207.164	888.807	15.892	14.905	277.037	1,196.641	-9.652	-1.341	-1.258	1.728	-10.523
2035	923.483	17.556	16.466	272.281	1,229.786	911.666	16.160	15.157	273.832	1,216.814	-11.817	-1.396	-1.309	1.551	-12.972
2036	951.233	17.881	16.772	266.707	1,252.594	937.280	16.429	15.409	267.969	1,237.087	-13.953	-1.453	-1.362	1.262	-15.507
2037	979.767	18.208	17.078	260.425	1,275.478	963.620	16.698	15.662	261.371	1,257.350	-16.147	-1.510	-1.416	0.946	-18.128
2038	1,009.127	18.538	17.387	253.538	1,298.591	990.740	16.969	15.916	254.142	1,277.767	-18.387	-1.569	-1.472	0.604	-20.824
2039	1,039.342	18.873	17.702	246.162	1,322.079	1,018.677	17.245	16.174	246.406	1,298.501	-20.665	-1.629	-1.528	0.244	-23.578
2040	1,070.428	19.217	18.024	238.456	1,346.125	1,047.478	17.527	16.439	238.321	1,319.764	-22.950	-1.690	-1.585	-0.135	-26.361
2041	1,102.862	19.571	18.357	230.182	1,370.972	1,077.662	17.820	16.714	229.638	1,341.835	-25.200	-1.751	-1.643	-0.543	-29.137
2042	1,135.806	19.930	18.693	221.642	1,396.070	1,108.398	18.117	16.992	220.656	1,364.162	-27.408	-1.813	-1.701	-0.986	-31.908
2043	1,169.222	20.301	19.041	213.523	1,422.087	1,139.706	18.426	17.282	212.060	1,387.475	-29.515	-1.875	-1.759	-1.463	-34.612
2044	1,203.458	20.693	19.408	205.971	1,449.531	1,171.992	18.756	17.592	203.996	1,412.336	-31.466	-1.937	-1.816	-1.976	-37.195
2045	1,237.567	21.099	19.790	199.551	1,478.006	1,204.307	19.102	17.916	197.026	1,438.351	-33.259	-1.998	-1.874	-2.525	-39.655
2046	1,272.090	21.532	20.196	194.503	1,508.321	1,237.250	19.474	18.265	191.397	1,466.387	-34.840	-2.058	-1.930	-3.106	-41.934
2047	1,306.623	21.987	20.623	190.978	1,540.211	1,270.393	19.869	18.636	187.258	1,496.157	-36.230	-2.118	-1.986	-3.720	-44.054
2048	1,341.078	22.464	21.070	189.012	1,573.624	1,303.655	20.287	19.028	184.654	1,527.624	-37.423	-2.177	-2.042	-4.358	-46.000
2049	1,375.782	22.963	21.538	188.299	1,608.582	1,337.351	20.728	19.441	183.282	1,560.802	-38.430	-2.235	-2.097	-5.018	-47.780
2050	1,410.697	23.476	22.019	188.279	1,644.470	1,371.413	21.183	19.868	182.584	1,595.048	-39.284	-2.293	-2.151	-5.695	-49.422
2051	1,445.114	23.989	22.500	188.832	1,680.435	1,405.074	21.640	20.297	182.449	1,629.459	-40.400	-2.349	-2.204	-6.383	-50.976
2052	1,479.004	24.502	22.981	189.844	1,716.331	1,438.322	22.097	20.726	182.766	1,663.911	-40.682	-2.404	-2.255	-7.078	-52.420
2053	1,512.436	25.015	23.463	191.401	1,752.315	1,471.208	22.557	21.157	183.631	1,698.553	-41.228	-2.458	-2.305	-7.770	-53.762
2054	1,545.815	25.536	23.951	193.499	1,788.801	1,504.148	23.026	21.597	185.052	1,733.822	-41.667	-2.510	-2.355	-8.447	-54.979
2055	1,579.190	26.064	24.446	196.074	1,825.774	1,537.176	23.502	22.043	186.979	1,769.701	-42.013	-2.562	-2.403	-9.095	-56.073
2056	1,612.569	26.598	24.947	199.082	1,863.196	1,570.285	23.986	22.497	189.381	1,806.149	-42.284	-2.612	-2.450	-9.701	-57.047
2057	1,645.949	27.138	25.454	202.483	1,901.023	1,603.453	24.477	22.958	192.231	1,843.119	-42.495	-2.661	-2.496	-10.252	-57.904
2058	1,679.319	27.683	25.965	206.223	1,939.191	1,636.658	24.974	23.424	195.490	1,880.546	-42.662	-2.709	-2.541	-10.733	-58.645
2059	1,712.644	28.231	26.479	210.243	1,977.597	1,669.845	25.476	23.895	199.112	1,918.328	-42.799	-2.755	-2.584	-11.130	-59.269
Total Contributions FY 2021-2059	\$43,347.604	\$771.831	\$723.924	\$9,188.144	\$54,031.504	\$42,774.388	\$709.497	\$665.460	\$9,100.770	\$53,250.112	-\$573.216	-\$62.334	-\$58.465	-\$87.374	-\$781.392
Total Present Value FY 2021-2059¹	\$12,677.551	\$239.727	\$224.847	\$3,616.639	\$16,758.764	\$12,721.977	\$224.936	\$210.974	\$3,614.987	\$16,772.874	\$44.426	-\$14.791	-\$13.873	-\$1.652	\$14.110

¹ In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 8 (Population Increases 1% Per Year for 10 years)
Based on Actuarial Valuation as of June 30, 2020

\$ in Millions														
Year Ending	June 30, 2020 Valuation Baseline							Stress Test Scenario 8						
	Investment Return	Total Required Employer Contribution	Increase in		Total Required Employer Contribution	Increase in AVA Funded Ratio	Annual Rate of Investment Return	Cumulative Geometric Return (from 2020)	Total Required Employer Contribution	Increase in		Total Required Employer Contribution	Increase in AVA Funded Ratio	
			Assets (AVA) Funded Ratio	Assets (MVA) Funded Ratio						Assets (AVA) Funded Ratio	Assets (MVA) Funded Ratio			
June 30 2020		\$854.500	46.69%	45.43%					\$854.500	46.69%	45.43%			
2021	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%	6.75%	6.75%	885.894	46.19%	45.29%	3.67%	-0.50%	
2022	6.75%	944.676	45.71%	45.32%	6.64%	-0.48%	6.75%	6.75%	950.902	45.74%	45.35%	7.34%	-0.45%	
2023	6.75%	966.871	45.45%	45.38%	2.35%	-0.26%	6.75%	6.75%	910.786	45.27%	45.20%	-4.22%	-0.47%	
2024	6.75%	988.997	45.50%	45.47%	2.29%	0.05%	6.75%	6.75%	938.204	45.12%	45.09%	3.01%	-0.15%	
2025	6.75%	1,010.868	45.60%	45.59%	2.21%	0.09%	6.75%	6.75%	965.946	45.04%	45.03%	2.96%	-0.08%	
2026	6.75%	1,032.573	45.73%	45.73%	2.15%	0.13%	6.75%	6.75%	994.111	45.01%	45.01%	2.92%	-0.02%	
2027	6.75%	1,054.243	45.90%	45.90%	2.10%	0.17%	6.75%	6.75%	1,022.872	45.04%	45.04%	2.89%	0.03%	
2028	6.75%	1,075.735	46.09%	46.09%	2.04%	0.19%	6.75%	6.75%	1,052.075	45.13%	45.13%	2.86%	0.09%	
2029	6.75%	1,097.009	46.31%	46.31%	1.98%	0.22%	6.75%	6.75%	1,081.752	45.27%	45.27%	2.82%	0.14%	
2030	6.75%	1,118.560	46.56%	46.56%	1.96%	0.25%	6.75%	6.75%	1,112.378	45.47%	45.47%	2.83%	0.20%	
2031	6.75%	1,140.529	46.86%	46.86%	1.96%	0.30%	6.75%	6.75%	1,144.118	45.76%	45.76%	2.85%	0.29%	
2032	6.75%	1,162.518	47.20%	47.20%	1.93%	0.33%	6.75%	6.75%	1,168.270	46.09%	46.09%	2.11%	0.33%	
2033	6.75%	1,184.677	47.56%	47.56%	1.91%	0.36%	6.75%	6.75%	1,192.637	46.45%	46.45%	2.09%	0.36%	
2034	6.75%	1,207.164	47.96%	47.96%	1.90%	0.40%	6.75%	6.75%	1,217.378	46.86%	46.86%	2.07%	0.41%	
2035	6.75%	1,229.786	48.40%	48.40%	1.87%	0.44%	6.75%	6.75%	1,242.325	47.31%	47.31%	2.05%	0.45%	
2036	6.75%	1,252.594	48.88%	48.88%	1.85%	0.48%	6.75%	6.75%	1,267.540	47.81%	47.81%	2.03%	0.51%	
2037	6.75%	1,275.478	49.42%	49.42%	1.83%	0.53%	6.75%	6.75%	1,292.914	48.38%	48.38%	2.00%	0.56%	
2038	6.75%	1,298.591	50.01%	50.01%	1.81%	0.59%	6.75%	6.75%	1,318.588	49.00%	49.00%	1.99%	0.62%	
2039	6.75%	1,322.079	50.65%	50.65%	1.81%	0.65%	6.75%	6.75%	1,344.697	49.69%	49.69%	1.98%	0.69%	
2040	6.75%	1,346.125	51.36%	51.36%	1.82%	0.71%	6.75%	6.75%	1,371.394	50.45%	50.45%	1.99%	0.76%	
2041	6.75%	1,370.972	52.14%	52.14%	1.85%	0.78%	6.75%	6.75%	1,398.893	51.29%	51.29%	2.01%	0.84%	
2042	6.75%	1,396.070	52.99%	52.99%	1.83%	0.85%	6.75%	6.75%	1,426.640	52.21%	52.21%	1.98%	0.92%	
2043	6.75%	1,422.087	53.93%	53.93%	1.86%	0.94%	6.75%	6.75%	1,455.246	53.22%	53.22%	2.01%	1.01%	
2044	6.75%	1,449.531	54.96%	54.96%	1.93%	1.03%	6.75%	6.75%	1,485.166	54.32%	54.32%	2.06%	1.11%	
2045	6.75%	1,478.006	56.10%	56.10%	1.96%	1.14%	6.75%	6.75%	1,516.002	55.54%	55.54%	2.08%	1.22%	
2046	6.75%	1,508.321	57.36%	57.36%	2.05%	1.26%	6.75%	6.75%	1,548.507	56.88%	56.88%	2.14%	1.34%	
2047	6.75%	1,540.211	58.75%	58.75%	2.11%	1.39%	6.75%	6.75%	1,582.434	58.36%	58.36%	2.19%	1.48%	
2048	6.75%	1,573.624	60.28%	60.28%	2.17%	1.54%	6.75%	6.75%	1,617.721	59.98%	59.98%	2.23%	1.62%	
2049	6.75%	1,608.582	61.98%	61.98%	2.22%	1.70%	6.75%	6.75%	1,654.394	61.77%	61.77%	2.27%	1.78%	
2050	6.75%	1,644.470	63.85%	63.85%	2.23%	1.87%	6.75%	6.75%	1,691.866	63.72%	63.72%	2.26%	1.95%	
2051	6.75%	1,680.435	65.90%	65.90%	2.19%	2.05%	6.75%	6.75%	1,729.331	65.84%	65.84%	2.21%	2.13%	
2052	6.75%	1,716.331	68.14%	68.14%	2.14%	2.24%	6.75%	6.75%	1,766.621	68.15%	68.15%	2.16%	2.31%	
2053	6.75%	1,752.315	70.58%	70.58%	2.10%	2.44%	6.75%	6.75%	1,803.903	70.64%	70.64%	2.11%	2.49%	
2054	6.75%	1,788.801	73.22%	73.22%	2.08%	2.65%	6.75%	6.75%	1,841.567	73.33%	73.33%	2.09%	2.69%	
2055	6.75%	1,825.774	76.09%	76.09%	2.07%	2.86%	6.75%	6.75%	1,879.602	76.22%	76.22%	2.07%	2.89%	
2056	6.75%	1,863.196	79.18%	79.18%	2.05%	3.09%	6.75%	6.75%	1,917.974	79.32%	79.32%	2.04%	3.10%	
2057	6.75%	1,901.023	82.52%	82.52%	2.03%	3.34%	6.75%	6.75%	1,956.639	82.64%	82.64%	2.02%	3.32%	
2058	6.75%	1,939.191	86.12%	86.12%	2.01%	3.60%	6.75%	6.75%	1,995.534	86.19%	86.19%	1.99%	3.56%	
2059	6.75%	1,977.597	90.00%	90.00%	1.98%	3.88%	6.75%	6.75%	2,034.559	90.00%	90.00%	1.96%	3.81%	
Total Contributions FY 2021-2059		\$54,031.504							\$54,777.380					
Total Present Value FY 2021-2059¹		\$16,758.764							\$16,742.664					
Difference from June 30, 2020 Valuation														
Total Contributions FY 2021-2059		\$0.000							\$745.876					
Total Present Value FY 2021-2059¹		\$0.000							-\$16.100					
Maximum Annual Increase					6.64%	3.88%					7.34%	3.81%		
Maximum Annual Decrease					1.81%	-0.50%					-4.22%	-0.50%		

¹In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



Public School Teachers' Pension and Retirement Fund of Chicago
Comparison of Actuarial Valuation Results and Stress Testing Scenario 8 (Population Increases 1% Per Year for 10 years)
Based on Actuarial Valuation as of June 30, 2020
Breakout of Contribution Requirements

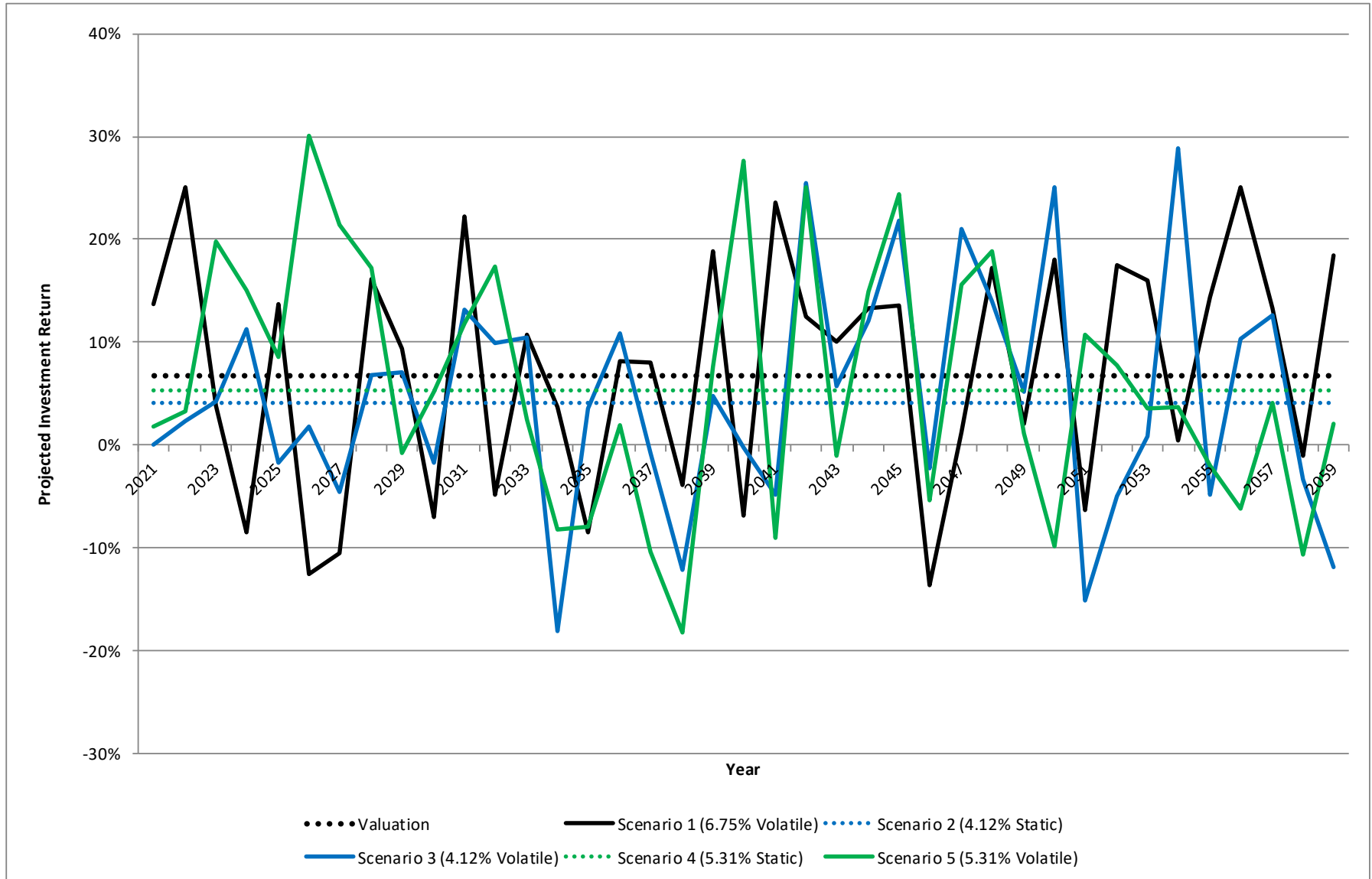
\$ in Millions

Year Ending June 30	June 30, 2020 Valuation Baseline					Stress Test Scenario 8					Difference				
	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution	Required Board of Education Contributions	Additional Board of Education Contributions	Additional State Contributions	State Contributions Pursuant to P.A. 100-0465	Total Required Employer Contribution
2020					\$854.500					\$854.500					\$0.000
2021	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$605.852	\$13.149	\$12.333	\$254.560	885.894	\$0.000	\$0.000	\$0.000	\$0.000	0.000
2022	653.694	13.486	12.649	264.848	944.676	660.000	13.575	12.732	264.595	950.902	6.306	0.089	0.083	-0.253	6.226
2023	671.117	13.803	12.946	269.005	966.871	615.157	13.988	13.120	268.521	910.786	-55.961	0.186	0.174	-0.484	-56.085
2024	689.059	14.118	13.242	272.577	988.997	638.424	14.409	13.515	271.856	938.204	-50.635	0.291	0.273	-0.721	-50.793
2025	707.478	14.431	13.535	275.424	1,010.868	662.741	14.836	13.915	274.455	965.946	-44.737	0.405	0.380	-0.969	-44.922
2026	726.144	14.741	13.826	277.863	1,032.573	687.877	15.268	14.320	276.645	994.111	-38.267	0.528	0.495	-1.218	-38.462
2027	745.310	15.050	14.116	279.767	1,054.243	714.130	15.710	14.735	278.297	1,022.872	-31.180	0.660	0.619	-1.470	-31.371
2028	765.039	15.357	14.404	280.936	1,075.735	741.544	16.158	15.155	279.217	1,052.075	-23.495	0.802	0.752	-1.719	-23.660
2029	785.207	15.660	14.688	281.453	1,097.009	770.060	16.614	15.583	279.495	1,081.752	-15.148	0.954	0.895	-1.958	-15.257
2030	806.268	15.968	14.977	281.347	1,118.560	800.104	17.085	16.024	279.165	1,112.378	-6.164	1.117	1.047	-2.182	-6.182
2031	828.304	16.282	15.271	280.673	1,140.529	831.788	17.572	16.481	278.277	1,144.118	3.484	1.290	1.210	-2.396	3.589
2032	850.883	16.596	15.565	279.473	1,162.518	856.260	17.943	16.829	277.238	1,168.270	5.377	1.347	1.264	-2.235	5.752
2033	874.185	16.912	15.862	277.718	1,184.677	881.515	18.317	17.180	275.624	1,192.637	7.331	1.405	1.318	-2.094	7.960
2034	898.459	17.233	16.163	275.309	1,207.164	907.768	18.697	17.537	273.377	1,217.378	9.309	1.464	1.373	-1.932	10.214
2035	923.483	17.556	16.466	272.281	1,229.786	934.809	19.080	17.896	270.540	1,242.325	11.326	1.525	1.430	-1.740	12.539
2036	951.233	17.881	16.772	266.707	1,252.594	964.547	19.468	18.259	265.266	1,267.540	13.314	1.586	1.488	-1.441	14.946
2037	979.767	18.208	17.078	260.425	1,275.478	995.120	19.857	18.625	259.312	1,292.914	15.352	1.649	1.547	-1.113	17.436
2038	1,009.127	18.538	17.387	253.538	1,298.591	1,026.560	20.252	18.995	252.781	1,318.588	17.433	1.714	1.607	-0.757	19.997
2039	1,039.342	18.873	17.702	246.162	1,322.079	1,058.894	20.653	19.371	245.780	1,344.697	19.552	1.779	1.669	-0.382	22.618
2040	1,070.428	19.217	18.024	238.456	1,346.125	1,092.108	21.063	19.755	238.468	1,371.394	21.680	1.846	1.731	0.012	25.269
2041	1,102.862	19.571	18.357	230.182	1,370.972	1,126.638	21.485	20.151	230.618	1,398.893	23.775	1.914	1.795	0.437	27.921
2042	1,135.806	19.930	18.693	221.642	1,396.070	1,161.636	21.911	20.551	222.542	1,426.640	25.830	1.982	1.859	0.900	30.570
2043	1,169.222	20.301	19.041	213.523	1,422.087	1,197.009	22.351	20.963	214.923	1,455.246	27.788	2.049	1.922	1.399	33.159
2044	1,203.458	20.693	19.408	205.971	1,449.531	1,233.051	22.810	21.394	207.910	1,485.166	29.593	2.117	1.986	1.939	35.635
2045	1,237.567	21.099	19.790	199.551	1,478.006	1,268.809	23.284	21.838	202.071	1,516.002	31.243	2.184	2.049	2.520	37.996
2046	1,272.090	21.532	20.196	194.503	1,508.321	1,304.775	23.783	22.307	197.642	1,548.507	32.685	2.251	2.111	3.139	40.186
2047	1,306.623	21.987	20.623	190.978	1,540.211	1,340.563	24.304	22.795	194.772	1,582.434	33.940	2.317	2.173	3.794	42.223
2048	1,341.078	22.464	21.070	189.012	1,573.624	1,376.079	24.846	23.304	193.492	1,617.721	35.001	2.382	2.234	4.480	44.097
2049	1,375.782	22.963	21.538	188.299	1,608.582	1,411.663	25.409	23.832	193.490	1,654.394	35.881	2.446	2.294	5.191	45.812
2050	1,410.697	23.476	22.019	188.279	1,644.470	1,447.308	25.985	24.372	194.202	1,691.866	36.610	2.509	2.353	5.923	47.396
2051	1,445.114	23.989	22.500	188.832	1,680.435	1,482.356	26.560	24.912	195.503	1,729.331	37.242	2.571	2.411	6.671	48.896
2052	1,479.004	24.502	22.981	189.844	1,716.331	1,516.767	27.133	25.449	197.272	1,766.621	37.763	2.631	2.468	7.428	50.290
2053	1,512.436	25.015	23.463	191.401	1,752.315	1,550.628	27.705	25.986	199.584	1,803.903	38.192	2.690	2.523	8.183	51.588
2054	1,545.815	25.536	23.951	193.499	1,788.801	1,584.332	28.284	26.528	202.423	1,841.567	38.518	2.748	2.577	8.924	52.766
2055	1,579.190	26.064	24.446	196.074	1,825.774	1,617.948	28.868	27.076	205.711	1,879.602	38.758	2.804	2.630	9.637	53.828
2056	1,612.569	26.598	24.947	199.082	1,863.196	1,651.499	29.457	27.629	209.389	1,917.974	38.930	2.859	2.682	10.307	54.778
2057	1,645.949	27.138	25.454	202.483	1,901.023	1,684.999	30.051	28.186	213.403	1,956.639	39.050	2.913	2.732	10.920	55.616
2058	1,679.319	27.683	25.965	206.223	1,939.191	1,718.455	30.649	28.746	217.684	1,995.534	39.135	2.966	2.782	11.461	56.343
2059	1,712.644	28.231	26.479	210.243	1,977.597	1,751.847	31.248	29.308	222.155	2,034.559	39.203	3.017	2.829	11.913	56.962
Total Contributions FY 2021-2059	\$43,347.604	\$771.831	\$723.924	\$9,188.144	\$54,031.504	\$43,871.619	\$839.816	\$787.689	\$9,278.256	\$54,777.380	\$524.015	\$67.985	\$63.765	\$90.111	\$745.876
Total Present Value FY 2021-2059¹	\$12,677.551	\$239.727	\$224.847	\$3,616.639	\$16,758.764	\$12,629.294	\$255.767	\$239.892	\$3,617.710	\$16,742.664	-\$48.257	\$16.041	\$15.045	\$1.071	-\$16.101

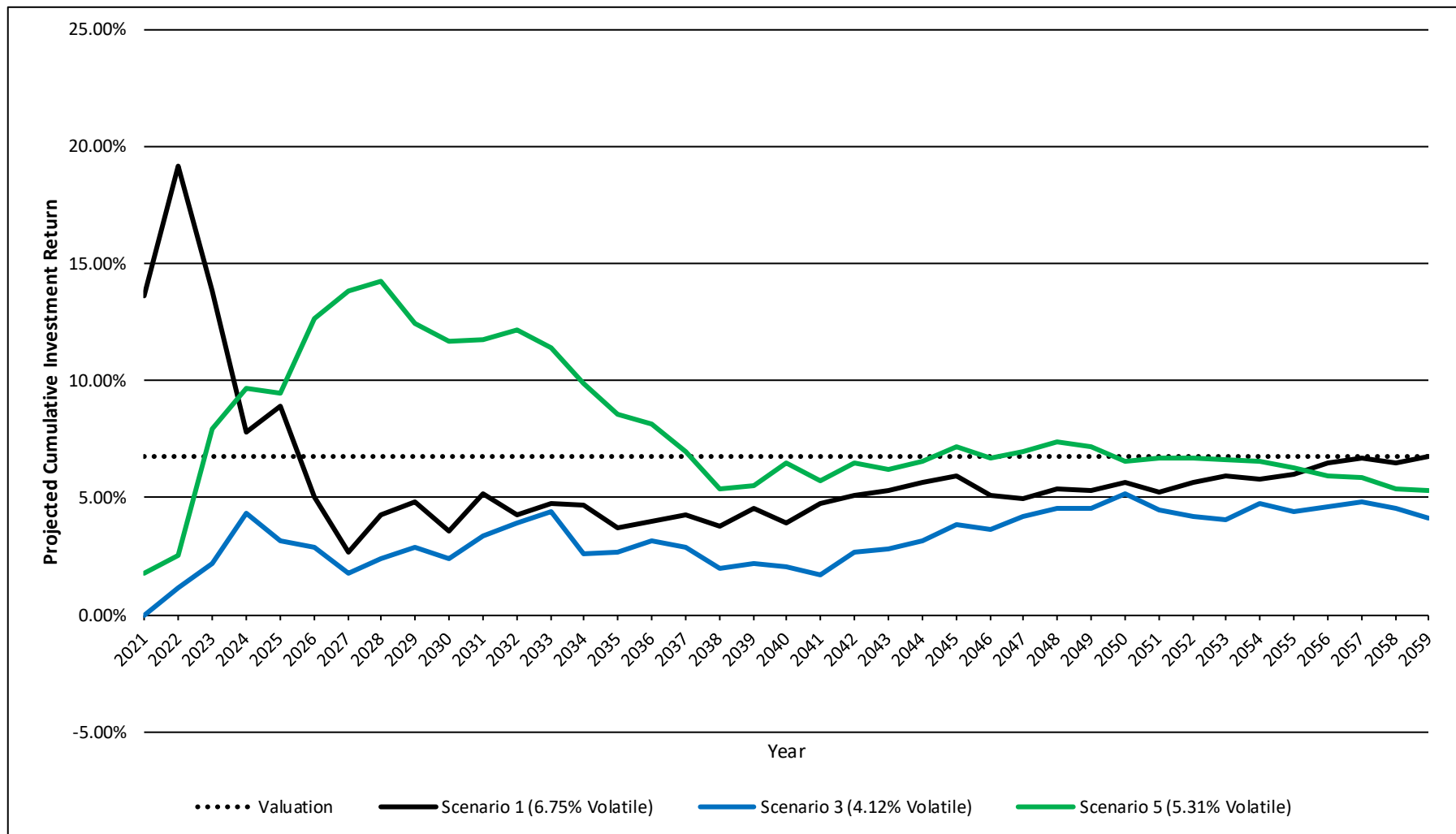
¹ In calculating the present value of contributions, total required employer contributions were assumed to occur mid-year, using a rate of 6.75 percent.



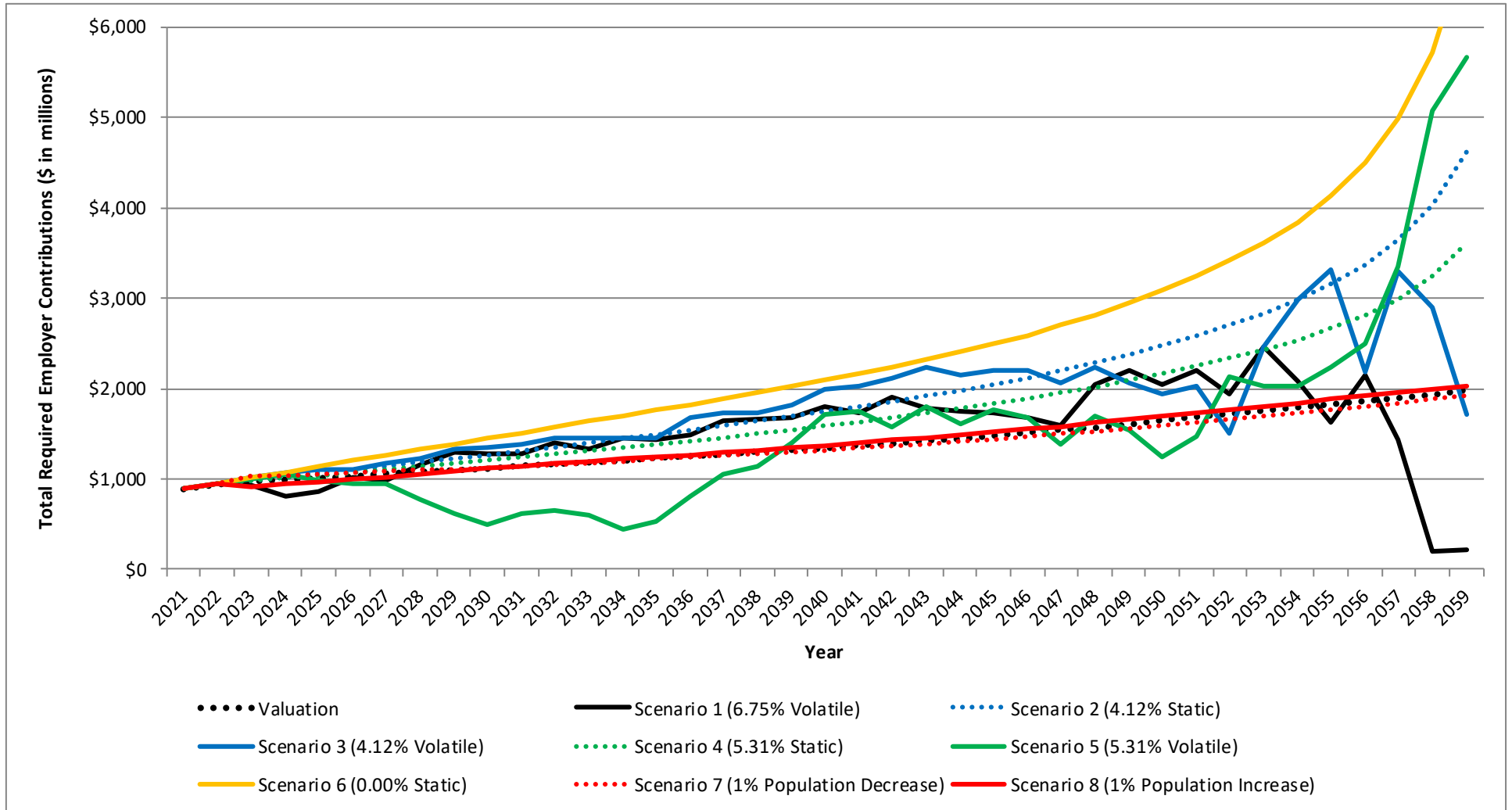
**Public School Teachers' Pension and Retirement Fund of Chicago
 Comparison of Projected Rates of Investment Return
 Assuming Valuation Assumptions (Annual Return of 6.75% and Constant Active Population)
 and Alternate Rates of Return and Active Population Changes under the Stress Testing Scenarios**



**Public School Teachers' Pension and Retirement Fund of Chicago
 Comparison of Projected Cumulative Rates of Investment Return
 Assuming Valuation Assumptions (Annual Return of 6.75% and Constant Active Population)
 and Alternate Rates of Return and Active Population Changes under the Stress Testing Scenarios**



**Public School Teachers' Pension and Retirement Fund of Chicago
 Comparison of Total Required Employer Contributions
 Assuming Valuation Assumptions (Annual Return of 6.75% and Constant Active Population)
 and Alternate Rates of Return and Active Population Changes under the Stress Testing Scenarios**



**Public School Teachers' Pension and Retirement Fund of Chicago
 Comparison of Funded Ratio
 Assuming Valuation Assumptions (Annual Return of 6.75% and Constant Active Population)
 and Alternate Rates of Return and Active Population Changes under the Stress Testing Scenarios**

