Public School Teachers' Pension and Retirement Fund of Chicago

Actuarial Valuation and Review as of June 30, 2015

Segal Consulting

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December 9, 2015

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

Dear Board Members:

We are pleased to submit this annual Actuarial Valuation and Review as of June 30, 2015. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, establishes the net pension liability under Governmental Accounting Standards Board (GASB) Statement No. 67 as of June 30, 2015, the actuarially determined contribution for the fiscal year ending June 30, 2016, the statutorily required contributions for the fiscal year ending June 30, 2017, and the liabilities of the other postemployment benefits as of June 30, 2015, under GASB Statement No. 43.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Public School Teachers' Pension and Retirement Fund of Chicago (CTPF). The census information and financial information on which our calculations were based was prepared by the Fund staff. That assistance is gratefully acknowledged. We have not subjected the census data to any auditing procedures, but have examined the data for reasonableness and consistency with the prior year's data. The accuracy and comprehensiveness of the data are the responsibility of those supplying the data.

Since the effective date of the last actuarial valuation, the only change in benefit provisions that had an impact on the actuarial liabilities of the Fund is that Medicare Part A payments are not subsidized for members with a pension benefit commencement date of July 1, 2016 or later.

The actuarial assumptions and methods are set by the Board of Trustees, based upon recommendations made by the Fund's actuary. The assumptions and methods used for the June 30, 2015, actuarial valuation were based on an experience analysis covering the five-year period ending June 30, 2012, and were adopted by the Board, effective for the June 30, 2013, valuation. These actuarial assumptions and methods comply with the parameters set by the Actuarial Standards of Practice and the parameters for disclosure of GASB 43 and 67.

CTPF is funded by Employer and Member Contributions in accordance with the funding policy specified under the Illinois Pension Code (40 ILCS 5/17). Based on the funding objective under the Illinois Pension Code, for Fiscal Years 2016 through 2059, the Board of Education is to make annual contributions calculated as a level percent of payroll sufficient to bring the total assets of the Fund up to 90% of the total actuarial accrued liabilities of the Fund by the end of the 2059 fiscal year. The methods mandated by the Illinois Pension Code are inadequate to appropriately fund CTPF.

The asset values used for the valuation were based on the asset information contained in the audited financial statements prepared by the Fund. For purposes of the actuarial valuation, a 4-year smoothed market value of assets was used to determine the actuarial value of assets. The actuarial value of assets for pension benefits is the total actuarial value of assets less the market value of assets dedicated for other postemployment benefits.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period); and changes in plan provisions or applicable law.

The actuarial calculations were directed under our supervision. We are members of the American Academy of Actuaries and we meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of our knowledge, the information supplied in the actuarial valuation is complete and accurate. Further, in our opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Fund.

Sincerely,

Segal Consulting, a Member of The Segal Group, Inc.

By:

Kim M. Nicholl, FSA, MAAA, EA, FCA *Senior Vice President and Actuary*	*Matthew A. Strom, FSA, MAAA, EA* *Vice President and Actuary*
Barbara Zaveduk, MAAA, EA *Vice President and Actuary*	*Yori Rubinson, FSA, MAAA* *Retiree Health Actuary*

Purpose

This report has been prepared by Segal Consulting to present a valuation of the Public School Teachers' Pension and Retirement Fund of Chicago (CTPF) as of June 30, 2015. The valuation was performed to determine the overall funded status and contribution requirements of the Fund. The contribution requirements presented in this report are based on:

- The benefit provisions of the Fund, as administered by the Board;
- The characteristics of covered active participants, inactive vested participants, and retirees and beneficiaries as of June 30, 2015, provided by the CTPF staff;
- The assets of the Fund as of June 30, 2015, provided by the CTPF staff;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.

Significant Issues in Valuation Year

The following key findings were the result of this actuarial valuation:

1. The Government Accounting Standards Board (GASB) approved two new Statements affecting the reporting of pension liabilities for accounting purposes. Statement 67 replaces Statement 25 and is for plan reporting. Statement 68 replaces Statement 27 and is for employer reporting. Statement 67 is effective with the fiscal year ending June 30, 2014, for Plan reporting. Statement 68 is effective with the fiscal year ending June 30, 2015, for employer reporting. The information contained in this valuation is intended to be used (along with other information) in order to comply with both Statements 67 and 68 (when applicable). Statements 43 and 45, for OPEB reporting, remain unchanged. However, new rules related to OPEB reporting (Statements 74 and 75) will be effective June 30, 2017, and June 30, 2018, respectively.
2. When measuring pension liability, GASB uses a different actuarial cost method (Entry Age method) than the cost method used for funding purposes (Projected Unit Credit method). However, as of June 30, 2015, the GASB blended discount rate calculation results in the same discount rate (expected return on assets) as used for funding purposes (7.75%). The total pension liability (TPL) measure for financial reporting is $20,713,217,296 as of June 30, 2015.

3. The net pension liability (NPL) is equal to the difference between the TPL and the Fund's fiduciary net position. The Fund's fiduciary net position is equal to the market value of assets. The NPL increased from $9,501,205,338 as of June 30, 2014, to $10,023,262,976 as of June 30, 2015.
4. Senate Bill 1946, which was signed into law on April 14, 2010, as Public Act 96-0889, revised the funding provisions that had previously been in effect. Public Act 96-0889 specifies that, for Fiscal Years 2014 through 2059, the Board of Education is to make annual contributions calculated as a level percent of payroll 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. Based on our projection, we have determined that the Board of Education's required contribution for Fiscal Year 2017 is $720,208,000. In conjunction with the additional State contributions and additional Board of Education contributions of $12,186,000 and $12,992,000, respectively, Fiscal Year 2017 contributions will total $745,386,000.
5. As shown in Chart 13, for the fiscal year beginning July 1, 2015, the actuarially determined contribution (ADC) amount is $749,796,517. The Fiscal Year 2016 required employer contribution amount was determined to be $700,070,000, as a part of the June 30, 2014, valuation. Given that $65,000,000 is expected to be used to pay health insurance subsidies, the required employer contribution for the pension plan is $635,070,000. Compared to the actuarially determined contribution of $749,796,517, the contribution deficiency is $114,726,517 as of July 1, 2015. Each year there is a contribution deficiency leads to an increased deficiency in all future years.
6. Required employer contributions for Fiscal Year 2015 were determined to be $708,667,000, based on the June 30, 2013, valuation. Actual employer contributions for Fiscal Year 2015 totaled $708,667,000.
7. The funded ratio based on the actuarial value of assets over the actuarial accrued liability as of June 30, 2015, is 51.8%, compared to 51.5% as of June 30, 2014.
8. For the year ended June 30, 2015, Segal has determined that the asset return on a market value basis was 3.6%. After gradual recognition of investment gains and losses under the actuarial smoothing method, the actuarial rate of return was 8.2%. This represents an experience gain when compared to the assumed rate of 7.75%. As of June 30, 2015, the actuarial value of assets ($10.37 billion) represented 96.8% of the market value ($10.71 billion).
9. The total unrecognized investment gain as of June 30, 2015, is $345,579,198. This investment gain will be recognized in the determination of the actuarial value of assets for funding purposes in the next few years, to the extent it is not offset by recognition of investment losses derived from future experience. This implies that earning the assumed rate of investment return of 7.75% per year (net of expenses) on a market value basis will result in investment gains on the actuarial value of assets in the next few years.

10. The portion of deferred investment gains and losses recognized in the calculation of the June 30, 2015, actuarial value of assets resulted in a gain of $45,212,951. Additionally, the demographic and liability experience resulted in a $33,120,109 gain.
11. As mentioned above, the current method used to determine the actuarial value of assets yields an amount that is 96.8% of the market value of assets as of June 30, 2015. Guidelines in Actuarial Standard of Practice No. 44 (Selection and Use of Asset Valuation Methods for Pension Valuations) recommend that asset values fall within a reasonable range around the corresponding market value. We believe the actuarial asset method currently complies with these guidelines.
12. This actuarial valuation report as of June 30, 2015, is based on financial data as of that date. Changes in the value of assets subsequent to that date are not reflected.

Summary of Key Valuation Results

	2016	2015	2014
Contributions for fiscal year beginning July 1:			
Required Board of Education contributions	$720,208,000	$675,059,000	$683,574,000
Additional Board of Education contributions	12,992,000	12,906,000	12,948,000
Additional State contributions	12,186,000	12,105,000	12,145,000
Total employer contributions	745,386,000	700,070,000	708,667,000
Actual employer contributions		--	708,667,000
Funding elements for fiscal year beginning July 1:			
Normal cost, including administrative expenses		$205,404,986	$204,510,202
Market value of assets		10,711,667,479	10,851,672,058
Actuarial value of assets		10,366,088,281	10,081,520,019
Actuarial accrued liability*		19,951,289,974	19,503,893,632
Unfunded/(overfunded) actuarial accrued liability		9,585,201,693	9,422,373,613
Funded ratio		51.96%	51.69%
Demographic data for plan year beginning July 1:			
Number of retirees and beneficiaries		28,114	27,722
Number of vested former participants		5,464	4,818
Number of active participants		29,706	30,654
Total salary supplied by the Fund		$2,155,604,327	$2,149,841,688
Average salary		$72,565	$70,133

**Pension only*

Summary of Key Valuation Results: Pension

	2015	2014
Contributions for plan year beginning July 1:		
Actuarially determined contribution requirement	$749,796,517	$728,488,520
Expected employer contributions	635,070,000	643,667,000
Actual	--	643,667,000
Funding elements for plan year beginning July 1:		
Employer normal cost, including administrative expenses	$140,404,986	$139,510,202
Market value of assets	10,689,954,320	10,815,694,614
Actuarial value of assets	10,344,375,122	10,045,542,575
Actuarial accrued liability	19,951,289,974	19,503,893,632
Unfunded/(overfunded) actuarial accrued liability	9,606,914,852	9,458,351,057
Funded ratio based on the actuarial value of assets	51.85%	51.51%
Funded ratio based on the market value of assets	53.58%	55.45%
GASB Information:		
Long-term expected rate of return	7.75%	7.75%
Long-term municipal bond rate	3.80%	4.29%
Single equivalent discount rate	7.75%	7.75%
Total pension liability	$20,713,217,296	$20,316,899,952
Plan fiduciary net position	10,689,954,320	10,815,694,614
Net pension liability	10,023,262,976	9,501,205,338
Plan fiduciary net position as a percentage of total pension liability	51.61%	53.23%

Summary of Key Valuation Results: OPEB

	2015	2014
Contributions for the plan year beginning July 1:		
Expected employer contributions	$65,000,000	$65,000,000
Actual employer contributions	--	65,000,000
Funding elements for plan year beginning July 1:		
Employer normal cost, including administrative expenses	$65,000,000	$65,000,000
Market value of assets	21,713,159	35,977,444
GASB 43 information:		
Discount rate	4.50%	4.50%
Actuarial accrued liability	$1,910,991,991	$1,938,855,895
Actuarial value of assets	21,713,159	35,977,444
Unfunded/(overfunded) actuarial accrued liability	1,889,278,832	1,902,878,451
Annual Required Contributions (ARC)	$135,505,273	$135,728,777

Important Information About Actuarial Valuations

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

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

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

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

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

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

A. MEMBER DATA

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

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

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

A historical perspective of how the participant population has changed over the past ten valuations can be seen in this chart.

CHART 1

Participant Population: 2006 – 2015

Year Ended June 30	Active Participants	Vested Terminated Participants	Retirees and Beneficiaries	Ratio of Non-Actives to Actives
2006	34,682	2,408	22,105	0.71
2007	32,968	2,752	23,623	0.80
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

Active Participants

Plan costs are affected by the age, years of service and salary of active participants. In this year's valuation, there were 29,706 active participants with an average age of 41.4, average years of service of 10.3 and average salary of $72,565. The 30,654 active participants in the prior valuation had an average age of 41.3, average years of service of 10.3 and average salary of $70,133.

Inactive Participants

In this year's valuation, there were 5,464 participants with a vested right to a deferred or immediate vested benefit.

These graphs show a distribution of active participants by age and by years of service.

CHART 2

Distribution of Active Participants by Age as of June 30, 2015

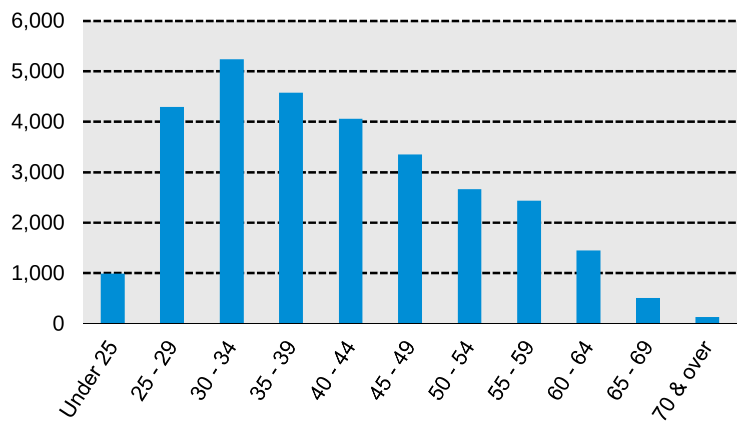
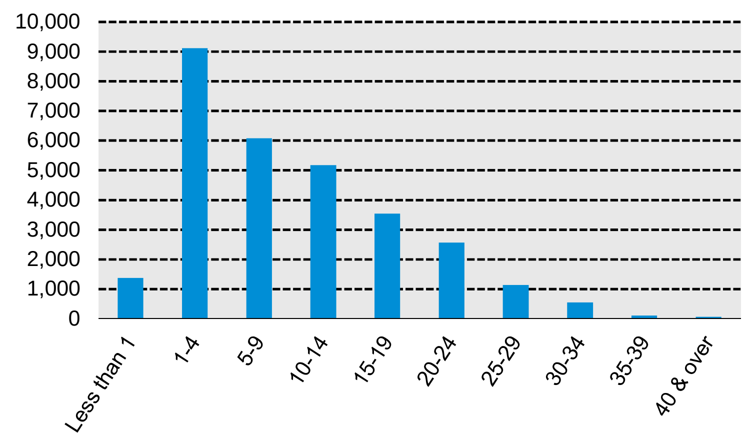


CHART 3

Distribution of Active Participants by Years of Service as of June 30, 2015



Retirees and Beneficiaries

As of June 30, 2015, 24,594 retirees, 3,050 beneficiaries, and 470 disabled retirees were receiving total monthly benefits of $109,988,699. For comparison, in the previous valuation, there were 24,251 retirees, 2,997 beneficiaries, and 474 disabled retirees receiving monthly benefits of $105,788,010.

These graphs show a distribution of the current retirees based on their monthly amount and age, by type of pension.

CHART 4

Distribution of Retirees by Monthly Amount as of June 30, 2015

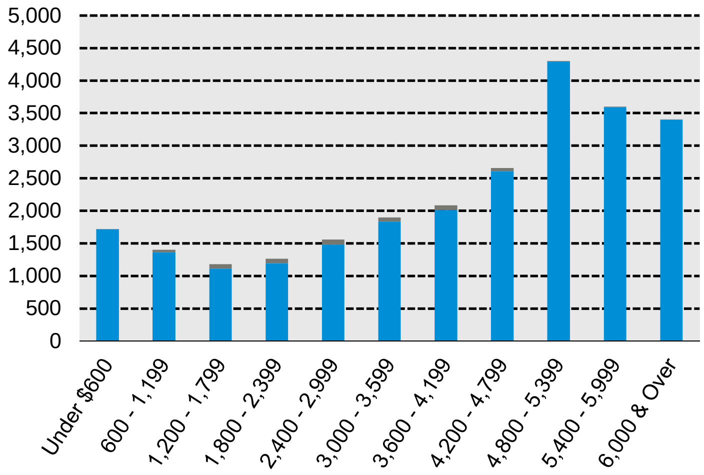
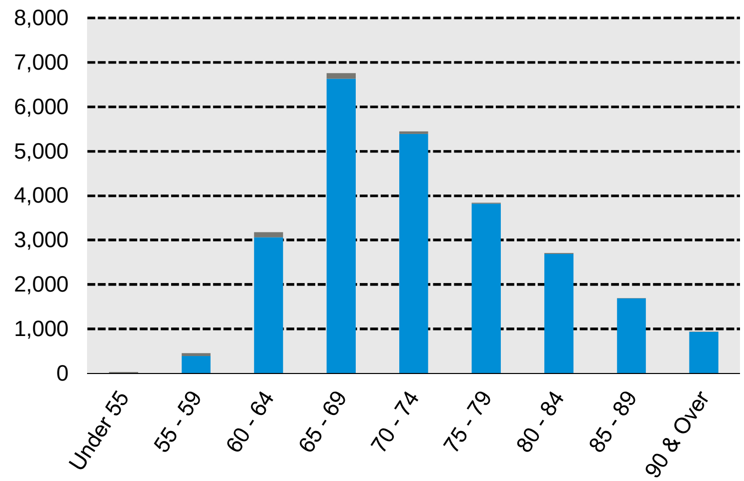


CHART 5

Distribution of Retirees by Age as of June 30, 2015



■ Disability

■ Regular

B. FINANCIAL INFORMATION

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable.

The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

The chart shows the determination of the actuarial value of assets as of the valuation date.

CHART 6

Determination of Actuarial Value of Assets for Years Ended June 30, 2015 and June 30, 2014

				2015		2014
1.	Actuarial value of assets as of prior June 30			$10,081,520,019		$9,458,316,094
2.	Employer and employee contributions and miscellaneous income			900,844,244		846,262,206
3.	Benefits and expenses			1,422,589,121		1,389,710,589
4.	Expected investment income			733,639,341		686,757,247
5.	Total investment income, including income for securities lending			381,740,298		1,685,134,974
6.	Investment gain/(loss) for the year ended June 30: (5) – (4)			(351,899,043)		998,377,727
7.	Expected actuarial value of assets: (1) + (2) – (3) + (4)			10,293,414,483		9,601,624,958
8.	Calculation of recognized return	Original Amount*	% Recognized		% Recognized	
(a)	Year ended June 30, 2015	-$351,899,043	25%	-$87,974,761		--
b)	Year ended June 30, 2014	998,377,727	25%	249,594,432	25%	$249,594,432
c)	Year ended June 30, 2013	460,168,226	25%	115,042,057	25%	115,042,057
d)	Year ended June 30, 2012	-815,951,719	25%	-203,987,930	25%	-203,987,930
e)	Year ended June 30, 2011	1,276,986,010			25%	319,246,503
f)	Total recognized return			72,673,798		479,895,061
9.	Total actuarial value of assets as of June 30: (7) + (8f)			10,366,088,281		10,081,520,019
10.	Assets for retiree health insurance benefits			21,713,159		35,977,444
11.	Actuarial value of assets for pension benefits: (9) – (10)			$10,344,375,122		$10,045,542,575

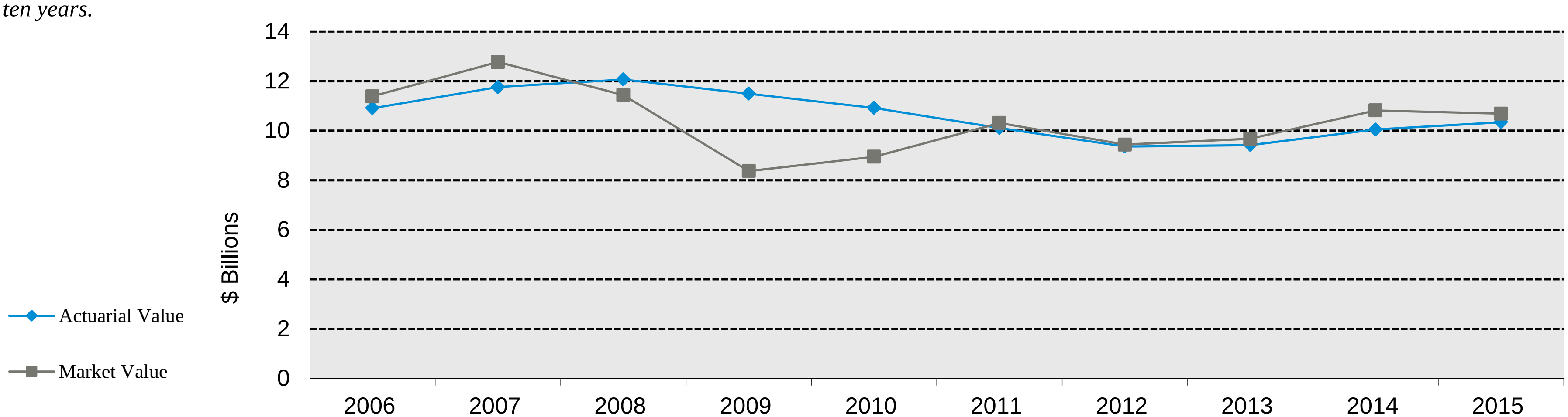
** Total return minus expected return on actuarial value*

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

This chart shows the change in the actuarial value of assets versus the market value over the past ten years.

CHART 7

Actuarial Value of Assets vs. Market Value of Assets as of June 30, 2006 – 2015



C. ACTUARIAL EXPERIENCE

To calculate the actuarially determined contribution, assumptions are made about future events that affect the amount and timing of benefits to be paid and assets to be accumulated. Each year actual experience is measured against the assumptions. If overall experience is more favorable than anticipated (an actuarial gain), the contribution requirement will decrease from the previous year. On the other hand, the contribution requirement will increase if overall actuarial experience is less favorable than expected (an actuarial loss).

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

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

The total gain is $78,333,060; $45,212,951 from investment gains and $33,120,109 in gains from all other sources. The net experience variation from individual sources other than investments was approximately 0.2% of the actuarial accrued liability. A discussion of the major components of the actuarial experience is on the following pages.

This chart provides a summary of the actuarial experience during the past year.

CHART 8

Actuarial Experience for Year Ended June 30, 2015

1.	Net gain/(loss) from investments*	$45,212,951
2.	Net gain/(loss) from administrative expenses	-686,716
3.	Net gain/(loss) from retiree health insurance cash flows	-9,833,404
3.	Net gain/(loss) from other experience**	43,640,229
5.	Net experience gain/(loss): (1) + (2) + (3)	$78,333,060

* *Details in Chart 9*

** *Details in Chart 12*

Investment Rate of Return

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the CTPF's investment policy. For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.75%. The actual rate of return on an actuarial basis for the year ending June 30, 2015, was 8.21%.

Since the actual return for the year was greater than the assumed return, the Fund experienced an actuarial gain during the year ended June 30, 2015, with regard to its investments.

This chart shows the gain/(loss) due to investment experience.

CHART 9

Actuarial Value Investment Experience for Year Ended June 30, 2015

1. Actual return	$806,313,139
2. Average value of assets	9,820,647,581
3. Actual rate of return: (1) ÷ (2)	8.21%
4. Assumed rate of return	7.75%
5. Expected return: (2) x (4)	$761,100,188
6. Actuarial gain/(loss): (1) – (5)	$45,212,951

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. Chart 10 shows the rate of return on an actuarial basis compared to the market value investment return for the last twenty-five years, including ten-year and twenty-five-year averages.

CHART 10
Investment Return

Year Ended June 30	Market Value	Actuarial Value*
1991	10.4%	n/a
1992	12.8%	n/a
1993	14.3%	n/a
1994	0.4%	n/a
1995	18.7%	n/a
1996	16.3%	n/a
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%
Average Returns		
Last 10 years:	6.4%	6.2%
Last 25 years:	8.7%	n/a

* *As determined by Segal*

Subsection B described the actuarial asset valuation method that gradually takes into account fluctuations in the market value rate of return. The effect of this is to stabilize the actuarial rate of return, which contributes to leveling pension plan costs. Chart 11 illustrates that the asset returns on a market basis are more volatile than asset returns on an actuarial basis.

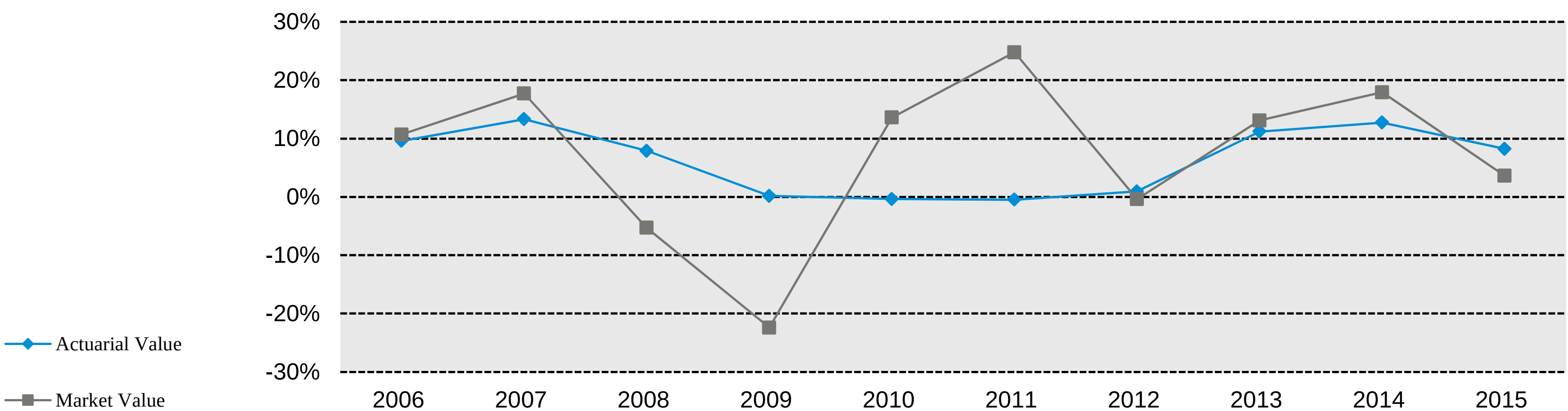
Administrative Expenses

Administrative expenses for the year ended June 30, 2015, totaled $11,705,562 compared to the assumption of $11,018,846. This resulted in a loss of $686,716 for the year.

This chart illustrates how this leveling effect has actually worked over the years 2006 - 2015.

CHART 11

Market and Actuarial Rates of Return for Years Ended June 30, 2006 - 2015



Other Experience

There are other differences between the expected and the actual experience that appear when the new valuation is compared with the projections from the previous valuation. These include:

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

The net gain from this other experience for the year ended June 30, 2015, amounted to $43,640,229, which is approximately 0.2% of the actuarial accrued liability.

A brief summary of the demographic gain/(loss) experience of the CTPF for the year ended June 30, 2015, is shown in the chart below.

The chart shows elements of the experience gain/(loss) for the most recent year.

CHART 12

Experience Due to Changes in Demographics for Year Ended June 30, 2015

1.	Termination	$10,625,923
2.	Retirement	-66,015,157
3.	Deaths among retired participants and beneficiaries	28,722,389
4.	Salary/service increase for continuing actives	79,584,326
5.	Miscellaneous	-9,277,252
6.	Total	$43,640,229

D. DEVELOPMENT OF EMPLOYER COSTS

Additional State Contributions

According to Section 17-127 of the Pension Code, the State shall make additional contributions of .544% of payroll to the Fund to offset a portion of the cost of benefit increases enacted under Public Act 90-582, except that no additional contributions are required if for the previous fiscal year the ratio of the fund's assets to total actuarial liabilities was at least 90%.

Based on the June 30, 2015, actuarial valuation, the ratio of the actuarial value of assets to total actuarial liabilities, or funded ratio, amounts to 52.0%. Therefore, additional State contributions will be required for Fiscal Year 2017. The total payroll for FY 2017 is projected to be $2,396,847,425. This total payroll includes employee contributions of 7% of salary paid by the Board of Education. Excluding these employee contributions from payroll results in an adjusted projected payroll of $2,240,044,322. Based on this adjusted projected payroll for Fiscal Year 2017, we have determined the additional State contributions under Section 17-127 of the Pension Code to be $12,186,000.

Additional Board of Education Contributions

According to Section 17-127.2 of the Pension Code, the Board of Education shall make additional contributions of .58% of each teacher's salary to the Fund to offset a portion of the cost of benefit increases enacted under Public Act 90-582, except that no additional contributions are required if for the previous fiscal year the ratio of the fund's assets to total actuarial liabilities was at least 90%. As the funded ratio as of June 30, 2015, is 52.0%, additional Board of Education contributions will be required for Fiscal Year 2017. Based on adjusted projected payroll of $2,240,044,322 for Fiscal Year 2017, we have determined the additional Board of Education contribution under Section 17-127.2 of the Pension Code to be $12,992,000.

Board of Education Required Contribution

Senate Bill 1946, which was signed into law on April 14, 2010, as Public Act 96-0889, revised the funding provisions that had previously been in effect. Public Act 96-0889 specifies that, for Fiscal Years 2014 through 2059, the Board of Education is to make annual contributions calculated as a level percent of payroll 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. Based on our projection, we have determined that the Board of Education's required contribution for Fiscal Year 2017 is $720,208,000 (net of Additional State and Board of Education Contributions).

The actuarially determined contribution is calculated to determine the contribution level needed to fund the plan and is measured against actual contributions as a measure of funding adequacy. The amount of actuarially determined contribution is comprised of an employer normal cost payment and a payment on the unfunded actuarial accrued liability. This total amount is then divided by the projected payroll for active participants to determine the actuarially determined contribution of 32.29% of payroll.

Effective July 1, 2013, the amortization period was set to 30 years, but will decline by one year in each subsequent valuation. As of July 1, 2015, there are 28 years remaining on this schedule.

For the plan year beginning July 1, 2015, the actuarially determined contribution is $749,796,517. Compared to the Fiscal Year 2016 required employer contributions for pension benefits of $635,070,000, the contribution deficiency is $114,726,517.

The chart shows the calculation of the actuarially determined contribution for the upcoming year.

CHART 13

Actuarially Determined Contribution

	Year Beginning July 1			
	2015		2014	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost*	$323,443,952	13.93%	$323,323,392	13.96%
2. Administrative expenses	12,290,840	0.53%	11,018,846	0.47%
3. Expected employee contributions	-195,329,806	-8.41%	-194,832,036	-8.41%
4. Employer normal cost: (1) + (2) + (3)	140,404,986	6.05%	$139,510,202	6.02%
5. Employer normal cost, adjusted for timing**	145,744,163	6.28%	144,815,353	6.25%
6. Actuarial accrued liability	19,951,289,974		19,503,893,632	
7. Actuarial value of assets	10,344,375,122		10,045,542,575	
8. Unfunded actuarial accrued liability: (6) - (7)	$9,606,914,852		$9,458,351,057	
9. Payment on unfunded actuarial accrued liability, adjusted for timing**	604,052,354	26.01%	583,673,167	25.20%
10. Actuarially determined contribution, adjusted for timing: (5) + (9)	749,796,517	32.29%	$728,488,520	31.45%
11. Projected payroll	$2,322,254,343		$2,316,336,417	

* *Reflects timing adjustment to the middle of the year*

** *Employer contributions are assumed to be paid at the end of the year.*

The contribution requirements as of June 30, 2015, are based on all of the data described in the previous sections, the actuarial assumptions described in Section 4, and the Plan provisions adopted at the time of preparation of the Actuarial Valuation. They include all changes affecting future costs, adopted benefit changes, actuarial gains and losses and changes in the actuarial assumptions.

Reconciliation of Actuarially Determined Contribution
The chart below details the changes in the actuarially determined contribution from the prior valuation to the current year's valuation.

The chart reconciles the contribution from the prior valuation to the amount determined in this valuation.

CHART 14

Reconciliation of Actuarially Determined Contribution from July 1, 2014 to July 1, 2015

Actuarially Determined Contribution as of July 1, 2014	$728,488,520
Effect of plan changes	$0
Effect of expected change in amortization payment due to payroll growth	20,428,561
Effect of change in administrative expense assumption	1,320,364
Effect of contributions (more)/less than actuarially determined contribution	5,604,080
Effect of investment (gain)/loss	-2,980,021
Effect of other gains and losses on accrued liability	-2,700,781
Effect of net other changes	-364,206
Total change	$21,307,997
Actuarially Determined Contribution as of July 1, 2015	$749,796,517

The total amount of OPEB payments in any year may not exceed 75% of the total cost of health insurance coverage in that year for all recipients who receive payments in that year. Total payments may not exceed $65,000,000 plus any amount that was authorized to be paid in the preceding year but was not actually paid (including any interest earned).

CHART 15

OPEB Funding

	2015	2014
Contributions for the plan year beginning July 1:		
Expected employer contributions	$65,000,000	$65,000,000
Actual employer contributions	--	65,000,000
Funding elements for plan year beginning July 1:		
Employer normal cost, including administrative expenses	$65,000,000	$65,000,000
Market value of assets	21,713,159	35,977,444

EXHIBIT A

Table of Plan Coverage

Category	Year Ended June 30 2015	Year Ended June 30 2014	Change From Prior Year
Active participants in valuation:			
Number	29,706	30,654	-3.1%
Average age	41.4	41.3	0.2%
Average years of service	10.3	10.3	0.0%
Total salary supplied by the Fund	$2,155,604,327	$2,149,841,688	0.3%
Average salary	$72,565	$70,133	3.5%
Total active vested participants	19,213	19,997	-3.9%
Male participants	7,033	7,215	-2.5%
Female participants	22,673	23,439	-3.3%
Vested terminated participants	5,464	4,818	13.4%
Service retirees:			
Number in pay status	24,594	24,251	1.4%
Average age	72.9	72.6	0.4%
Average monthly benefit	$4,206	$4,106	2.4%
Total annual benefit	$1,241,262,452	$1,194,862,326	3.9%
Disabled retirees:			
Number in pay status	470	474	-0.8%
Average age	66.2	66.2	0.0%
Average monthly benefit	$2,901	$2,812	3.2%
Total annual benefit	$16,364,372	$15,995,375	2.3%
Beneficiaries (including children) in pay status:			
Number in pay status	3,050	2,997	1.8%
Average age	75.6	75.1	0.7%
Average monthly benefit	$1,700	$1,629	4.4%
Total annual benefit	$62,237,560	$58,598,429	6.2%
Total number of participants*	63,284	63,194	0.1%

*There were 17,490 retirees and beneficiaries receiving health insurance subsidies as of June 30, 2015, and 18,171 as of June 30, 2014.

EXHIBIT B

Participants in Active Service as of June 30, 2015
By Age, Years of Service, and Average Salary

		Years of Service									
Age	**Total**	**<1**	**1-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30-34**	**35-39**	**40 & over**
Under 25	992	208	784	- -	- -	- -	- -	- -	- -	- -	- -
	$42,859	$14,278	$50,442	- -	- -	- -	- -	- -	- -	- -	- -
25-29	4,294	347	3,382	565	- -	- -	- -	- -	- -	- -	- -
	52,688	15,130	54,248	$66,421	- -	- -	- -	- -	- -	- -	- -
30-34	5,243	206	2,245	2,237	555	- -	- -	- -	- -	- -	- -
	64,331	14,841	56,448	71,812	$84,437	- -	- -	- -	- -	- -	- -
35-39	4,577	158	986	1,351	1,754	328	- -	- -	- -	- -	- -
	75,472	13,527	57,164	74,825	87,806	$97,057	- -	- -	- -	- -	- -
40-44	4,059	121	642	743	1,096	1,170	287	- -	- -	- -	- -
	82,216	14,637	57,323	74,980	88,810	96,403	$102,105	- -	- -	- -	- -
45-49	3,350	107	389	456	620	792	833	152	1	- -	- -
	84,826	11,177	57,419	71,675	87,317	94,645	99,684	$103,536	$80,087	- -	- -
50-54	2,663	76	291	275	440	496	585	394	106	- -	- -
	83,950	12,281	51,767	70,582	86,395	89,811	94,997	98,505	105,718	- -	- -
55-59	2,436	64	194	212	382	408	490	352	291	43	- -
	83,763	11,191	45,640	60,271	80,628	90,030	93,543	95,768	103,080	$107,556	- -
60-64	1,454	53	125	152	224	268	278	176	104	48	26
	80,203	9,305	35,153	53,664	79,603	89,310	95,740	96,620	99,760	107,537	$101,847
65-69	509	29	54	62	86	68	78	49	34	15	34
	69,788	4,039	24,083	43,938	64,789	74,409	93,621	97,951	101,895	97,691	109,317
70 & over	129	10	27	24	15	14	13	12	7	4	3
	50,366	7,591	11,799	24,019	56,053	67,318	82,050	103,672	105,614	80,849	123,195
Total	29,706	1,379	9,119	6,077	5,172	3,544	2,564	1,135	543	110	63
	$72,565	$13,573	$54,301	$70,972	$86,118	$93,341	$97,011	$98,068	$102,875	$105,230	$106,895

EXHIBIT C

Reconciliation of Participant Data

	Active Participants	Vested Former Participants	Retirees	Disabled Retirees	Beneficiaries	Total
Number as of June 30, 2014	30,654	4,818	24,251	474	2,997	63,194
New participants	2,858	N/A	N/A	N/A	N/A	2,858
Terminations – with vested rights	-1,073	1,073	0	0	0	0
Terminations – without vested rights	-2,278	N/A	N/A	N/A	N/A	-2,278
Retirements	-859	-160	1,019	N/A	N/A	0
New disabilities	-17	-9	N/A	26	N/A	0
Conversion from duty disability to service pension	N/A	N/A	4	-4	N/A	0
New beneficiary	N/A	N/A	N/A	N/A	220	220
Deaths	-37	-16	-712	-26	-160	-951
Refunds	-158	-72	0	0	0	-230
Rehire	616	-162	-1	N/A	N/A	453
Certain period expired	N/A	N/A	0	0	-7	-7
Data adjustments	0	-8	33	0	0	25
Number as of June 30, 2015	29,706	5,464	24,594	470	3,050	63,284

EXHIBIT D

Schedule of Retirees and Beneficiaries Added to and Removed from Rolls

	Added to Rolls		Removed from Rolls		Rolls – End of Year			
Fiscal Year	Number	Annual Allowances	Number	Annual Allowances	Number	Annual Allowances	Average Annual Allowances	% Increase in Avg. Annual Allowances
2005	2,631	$117,025,483	943	$23,137,112	20,954	$688,259,518	$32,846	6.5
2006	1,788	91,991,917	637	15,910,849	22,105	764,340,586	34,578	5.3
2007	2,055	104,043,221	537	14,063,967	23,623	854,319,840	36,165	4.6
2008	881	67,060,461	584	16,543,468	23,920	904,836,833	37,828	4.6
2009	957	57,109,256	659	19,557,718	24,218	942,388,371	38,913	2.9
2010	1,080	67,630,266	698	21,855,794	24,600	988,162,843	40,169	3.2
2011	1,394	86,404,558	795	26,694,342	25,199	1,047,873,059	41,584	3.5
2012	1,579	96,719,811	852	28,511,983	25,926	1,116,080,887	43,049	3.5
2013	2,129	130,553,477	615	21,764,846	27,440	1,224,869,518	44,638	3.7
2014	1,006	70,963,133	724	26,376,522	27,722	1,269,456,130	45,792	2.6
2015	1,302	85,087,053	910	34,678,799	28,114	1,319,864,384	46,947	2.5

EXHIBIT E.1

Distribution of Current Annuitants by Benefit Type and Amount as of June 30, 2015

Monthly Pension Amount	Retirees		Disabled Retirees		Beneficiaries		Total	
	Male	Female	Male	Female	Male	Female	Male	Female
$0 - 499	406	988	2	1	168	250	576	1,239
$500 - 999	392	861	7	15	225	390	624	1,266
$1,000 - 1,499	328	667	14	38	155	223	497	928
$1,500 - 1,999	246	669	11	45	188	249	445	963
$2,000 - 2,499	246	804	13	47	175	275	434	1,126
$2,500 - 2,999	287	970	12	52	155	295	454	1,317
$3,000 - 3,499	310	1,187	15	39	24	109	349	1,335
$3,500 - 3,999	341	1,344	15	43	14	56	370	1,443
$4,000 - 4,499	399	1,384	8	47	9	47	416	1,478
$4,500 - 4,999	692	2,052	6	20	2	18	700	2,090
$5,000 - 5,499	943	2,837	2	8	5	14	950	2,859
$5,500 - 5,999	711	2,133	0	1	0	1	711	2,135
$6,000 - 6,499	296	790	2	1	0	1	298	792
$6,500 - 6,999	214	313	0	1	0	0	214	314
$7,000 - 7,499	152	258	1	2	0	0	153	260
$7,500 - 7,999	107	229	1	0	0	0	108	229
$8,000 - 8,499	92	175	1	0	1	0	94	175
$8,500 - 8,999	82	132	0	0	0	0	82	132
$9,000 & over	202	355	0	0	0	1	202	356
Total	6,446	18,148	110	360	1,121	1,929	7,677	20,437

EXHIBIT E.2

Distribution of Current Annuitants with Health Insurance Reimbursements by Benefit Amount as of June 30, 2015

	Health Insurance	
Monthly Pension Amount	**Male**	**Female**
$0 - 499	44	110
$500 - 999	91	290
$1,000 - 1,499	131	280
$1,500 - 1,999	128	436
$2,000 - 2,499	150	596
$2,500 - 2,999	191	793
$3,000 - 3,499	194	881
$3,500 - 3,999	249	1,014
$4,000 - 4,499	287	1,073
$4,500 - 4,999	554	1,668
$5,000 - 5,499	776	2,371
$5,500 - 5,999	580	1,740
$6,000 - 6,499	251	644
$6,500 - 6,999	176	266
$7,000 - 7,499	124	231
$7,500 - 7,999	92	189
$8,000 - 8,499	85	154
$8,500 - 8,999	70	114
$9,000 & over	172	295
Total	4,345	13,145

EXHIBIT F
Schedule of Average Benefit Payments

	Years of Credited Service							
	0-4	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total**
Fiscal Year 2012								
Average Monthly Pension	$348	$842	$1,452	$2,522	$3,308	$4,142	$5,788	$3,846
Average Final Salary	$6,690	$5,457	$5,509	$6,696	$7,049	$7,173	$7,887	$7,114
Number of Retired Participants	72	114	84	134	221	157	538	1,320
Average Age								63.2
Fiscal Year 2013								
Average Monthly Pension	$275	$856	$1,645	$2,761	$3,567	$4,422	$5,976	$4,294
Average Final Salary	$5,623	$5,491	$6,180	$7,136	$7,495	$7,688	$8,157	$7,535
Number of Retired Participants	56	114	91	186	380	256	824	1,907
Average Age								63.2
Fiscal Year 2014								
Average Monthly Pension	$262	$758	$1,648	$2,581	$3,477	$4,307	$5,683	$3,217
Average Final Salary	$6,555	$5,023	$6,309	$6,657	$7,376	$7,516	$7,823	$6,958
Number of Retired Participants	46	89	74	102	184	120	145	760
Average Age								63.4
Fiscal Year 2015								
Average Monthly Pension	$275	$877	$1,606	$2,621	$3,530	$4,254	$5,561	$3,398
Average Final Salary	$6,587	$5,377	$5,891	$6,851	$7,555	$7,483	$7,762	$7,077
Number of Retired Participants	47	104	117	107	269	172	240	1,056
Average Age								63.2

Table does not include disabled participants or surviving spouses.

EXHIBIT G
Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended June 30, 2015		Year Ended June 30, 2014	
Net assets at market value at the beginning of the year		$10,851,672,058		$9,709,985,467
Contribution income:				
Employer contributions	$708,667,000		$650,416,141	
Employee contributions	191,233,298		187,846,065	
Administrative expenses	-11,705,562		-10,494,139	
Net contribution income		888,194,736		827,768,067
Insurance company reimbursement		0		8,000,000
Miscellaneous income		943,946		0
Investment income:				
Interest, dividends and other income	$250,256,690		$237,139,828	
Asset appreciation	187,218,929		1,486,073,269	
Securities lending income	-17,725,693		2,999,976	
Less investment and administrative fees	-38,009,628		-41,078,099	
Net investment income		381,740,298		1,685,134,974
Total income available for benefits		$1,270,878,980		$2,520,903,041
Less benefit payments:				
Annuity payments	-$1,304,494,978		-$1,269,835,064	
Refund of insurance premiums	-79,316,153		-72,874,594	
Refund of contributions	-23,879,796		-32,832,171	
Death benefits	-3,192,632		-3,674,621	
Net benefit payments		-$1,410,883,559		-$1,379,216,450
Change in reserve for future benefits		-$140,004,579		$1,141,686,591
Net assets at market value at the end of the year		$10,711,667,479		$10,851,672,058

EXHIBIT H

Summary Statement of Plan Assets

	Year Ended June 30, 2015		Year Ended June 30, 2014	
Cash equivalents		$653,289,409		$11,782,210
Accounts receivable		183,477,636		169,404,046
Investments, at fair value:				
Equities	$5,637,712,550		$6,234,288,422	
Fixed income	1,904,385,564		1,998,455,301	
Commingled funds	1,301,799,976		1,230,947,404	
Short-term investments	359,908,522		929,886,758	
Private equity	314,350,916		297,705,749	
Real estate	266,567,126		299,147,976	
Public REITs	143,138,024		52,778,941	
Infrastructure	107,591,285		141,571,217	
Margin cash	65,287		790,472	
Total investments at market value		10,035,519,250		11,185,572,240
Invested securities lending collateral		485,612,851		505,301,189
Capital assets		1,003,753		1,506,069
Prepaid expenses		13,815		13,150
Total assets		$11,358,916,714		$11,873,578,904
Less accounts payable:				
Benefits payable	-$3,058,200		-$3,551,111	
Refunds payable	-8,462,208		-12,537,535	
Accounts and administrative expenses payable	-14,691,791		-16,009,072	
Securities lending collateral	-499,244,106		-520,146,384	
Due to brokers for securities purchased	-121,792,930		-469,662,744	
Total accounts payable		-$647,249,235		-$1,021,906,846
Net assets at market value		$10,711,667,479		$10,851,672,058
Net assets at actuarial value		$10,366,088,281		$10,081,520,019

EXHIBIT I.1

Development of the Fund Through June 30, 2015 (Pension)

Year Ended June 30	Employer Contributions	Employee Contributions	Net Investment Return*	Miscellaneous	Administrative Expenses	Benefit Payments	Actuarial Value of Assets at End of Year
2006	$52,789,706	$163,419,386	$1,033,995,851**	$139,509	$8,320,340	$751,791,350	$10,906,940,848
2007	103,761,750	179,017,663	1,415,420,214	1,923	8,434,688	837,008,647	11,759,699,063
2008	164,270,412	172,504,804	905,021,878	0	7,827,576	924,251,543	12,069,417,038
2009	198,069,327	176,176,975	21,935,841	0	8,751,945	963,591,482	11,493,255,754
2010	290,759,950	194,621,551	-39,885,503	0	8,800,848	1,012,533,911	10,917,416,993
2011	143,589,994	185,882,636	-50,121,733	55,307	9,527,938	1,077,980,337	10,109,314,922
2012	138,729,011	187,141,384	92,083,763	431,790	10,120,434	1,153,503,764	9,364,076,672
2013	142,654,000	188,356,294	996,069,982	0	11,537,394	1,257,100,364	9,422,519,190
2014	585,416,141	187,846,065	1,166,597,174	0	10,494,139	1,306,341,856	10,045,542,575
2015	643,667,000	191,233,298	806,261,271	943,946	11,705,562	1,331,567,406	10,344,375,122

** Net of investment fees*

*** Includes $59,496,735 transferred from health insurance assets*

EXHIBIT I.2

Development of the Fund Through June 30, 2015 (OPEB)

Year Ended June 30	Employer Contributions	Employee Contributions	Net Investment Return*	Miscellaneous	Administrative Expenses	Benefit Payments	Actuarial Value of Assets at End of Year
2006	$65,000,000	$0	-$55,425,642**	$0	$0	$58,279,900	$41,057,585
2007	65,000,000	0	2,373,014	0	0	61,028,841	47,401,758
2008	65,000,000	0	1,278,818	0	0	68,691,191	44,989,385
2009	65,000,000	0	514,200	15,000,000	0	75,811,835	49,691,750
2010	65,000,000	0	119,855	0	0	79,953,873	34,857,732
2011	65,000,000	0	20,471	10,338,661	0	78,892,292	31,324,572
2012	65,000,000	0	41,058	6,770,651	0	69,011,323	34,124,958
2013	65,000,000	0	82,822	8,352,647	0	71,763,523	35,796,904
2014	65,000,000	0	55,134	8,000,000	0	72,874,594	35,977,444
2015	65,000,000	0	51,868	0	0	79,316,153	21,713,159

** Net of investment fees*
*** Includes $59,496,735 transferred to pension assets*

EXHIBIT J

Development of Unfunded Actuarial Accrued Liability

	Year Ending June 30			
	2015		2014	
1. Unfunded actuarial accrued liability at beginning of year		$9,422,373,613		$9,586,216,922
2. Normal cost at beginning of year		387,497,642		390,738,428
3. Total contributions		899,900,298		838,262,206
4. Interest				
(a) Unfunded actuarial accrued liability and normal cost	$760,265,022		$773,214,040	
(b) Total contributions	6,701,226		6,582,531	
(c) Total interest: (4a) – (4b)		753,563,796		766,631,509
5. Expected unfunded actuarial accrued liability: (1) + (2) – (3) + (4c)		$9,663,534,753		$9,905,324,653
6. Changes due to (gain)/loss from:				
(a) Investments	-$45,212,951		-$454,691,436	
(b) Demographics and other	-33,120,109		-28,259,604	
(c) Total changes due to (gain)/loss: (6a) + (6b)		-78,333,060		-482,951,040
7. Change to due plan changes		0		0
8. Change in actuarial assumptions		0		0
9. Unfunded accrued liability at end of year: (5) + (6c) + (7) + (8)		$9,585,201,693		$9,422,373,613

EXHIBIT K

Definitions of Terms

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

Actuarial Accrued Liability For Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability For Pensioners:	The single-sum value of lifetime benefits to existing pensioners. This sum takes account of life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the Actuarially Determined Contribution.
Actuarial Gain or Actuarial Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., CTPF's assets earn more than projected, salary increases are less than assumed, participants retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.

Actuarial Present Value (APV): The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:

a. Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)
b. Multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
c. Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Present Value of Future Plan Benefits: The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active participant, retired participants, beneficiaries receiving benefits, and inactive participants entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would be provide sufficient assets to pay all projected benefits and expenses when due.

Actuarial Valuation: The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).

Actuarial Value of Assets: The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.

Actuarially Determined: Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.

Actuarially Determined Contribution (ADC): The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Fund's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.

Amortization Method: A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active participants will increase.

Amortization Payment: The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.

Assumptions or Actuarial Assumptions: The estimates on which the cost of the Fund is calculated including:

(a) <u>Investment return</u> — the rate of investment yield that the Fund will earn over the long-term future;

(b) <u>Mortality rates</u> — the death rates of employees and pensioners; life expectancy is based on these rates;

(c) <u>Retirement rates</u> — the rate or probability of retirement at a given age;

(d) <u>Turnover rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;

(e) <u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.

Closed Amortization Period: A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period.

Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or termination.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employers. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA, as another measure of the Plan's health.
GASB 25 and GASB 27:	Governmental Accounting Standards Board Statements No. 25 and No. 27. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 27 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 25 sets the rules for the systems themselves.
GASB: 43 and GASB 45:	Governmental Accounting Standards Board Statements No. 43 and No. 45. These are the governmental accounting standards that set the accounting rules for public postemployment benefit plans other than pension plans and the employers that sponsor or contribute to them. Statement No. 45 sets the accounting rules for the employers that sponsor or contribute to public postemployment benefit plans other than pension plans, while Statement No. 43 sets the rules for the plans themselves.
GASB 67 and GASB 68:	Governmental Accounting Standards Board Statements No. 67 and No. 68 are the successor statements to GASB Statements No. 25 and No. 27.

GASB 74 and GASB 75:	Governmental Accounting Standards Board Statements No. 74 and No. 75 are the successor statements to GASB Statements No. 43 and No. 45.
Investment Return (Discount Rate):	The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next. If the plan is funded on a pay-as-you go basis, the discount rate is tied to the expected rate of return on day-to-day employer funds.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never completely disappear, but will become smaller each year, either as a dollar amount, or in relation to covered payroll, if the actuarial assumptions are realized.
Plan Fiduciary Net Position:	Market value of assets.
Total Pension Liability (TPL):	The actuarially accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
Unfunded Actuarial Accrued Liability (UAAL):	The excess of the actuarial accrued liability over the Actuarial Value of Assets. This value may be negative in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.

Valuation Date or Actuarial Valuation Date: The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

EXHIBIT I

Summary of Actuarial Valuation Results

The valuation was made with respect to the following data supplied to us:

1.	Pensioners as of the valuation date (including 3,050 beneficiaries and 470 disabled retirees)		28,114
	Pensioners receiving health insurance subsidies as of the valuation date	17,490	
	Pensioners not receiving health insurance subsidies as of the valuation date	10,624	
2.	Participants inactive during year ended June 30, 2015 with vested rights		5,464
3.	Participants active during the year ended June 30, 2015		29,706
	Fully vested	19,213	
	Not vested	10,493	

The actuarial factors as of the valuation date are as follows:

1.	Actuarial accrued liability		$19,951,289,974
	Service retirees	$13,982,839,092	
	Disabled retirees	178,543,728	
	Beneficiaries	538,065,595	
	Inactive participants with vested rights	408,992,327	
	Active participants:		
	Retirement	4,192,732,266	
	Turnover	453,844,468	
	Mortality	101,375,020	
	Disability	94,897,478	
	Total	4,842,849,232	
2.	Actuarial value of assets ($10,689,954,320 at market value)*		10,344,375,122
3.	Unfunded actuarial accrued liability: (1) – (2)		$9,606,914,852
4.	Funded ratio: (2) ÷ (3)		51.8%

**Excludes assets dedicated to retiree health insurance subsidies*

EXHIBIT I (continued)

Summary of Actuarial Valuation Results

Components of normal cost:	Tier 1		Tier 2		Total	
	% of Payroll	Amount	% of Payroll	Amount	% of Payroll	Amount
1. Retirement	12.63%	$244,144,599	1.57%	$6,126,907	10.78%	$250,271,506
2. Turnover	1.82%	35,182,604	2.89%	11,249,607	2.00%	46,432,211
3. Mortality	0.37%	7,106,672	0.15%	570,152	0.33%	7,676,824
4. Disability	0.34%	6,533,278	0.17%	681,120	0.31%	7,214,398
5. Total normal cost: (1) + (2) + (3) + (4)	15.16%	$292,967,153	4.78%	$18,627,786	13.42%	$311,594,939
6. Total normal cost, adjusted to the middle of the year					13.93%	323,443,952
7. Health insurance reimbursement					2.80%	65,000,000
8. Administrative expenses					0.53%	12,290,840
9. Total normal cost, including administrative expenses: (6) + (7) + (8)					17.26%	$400,734,792
10. Expected employee contributions					-8.41%	-195,329,806
11. Employer normal cost: (9) + (10)					8.85%	$205,404,986

** Based on projected payroll of $2,322,254,343.*

EXHIBIT II

Funded Ratio

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

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

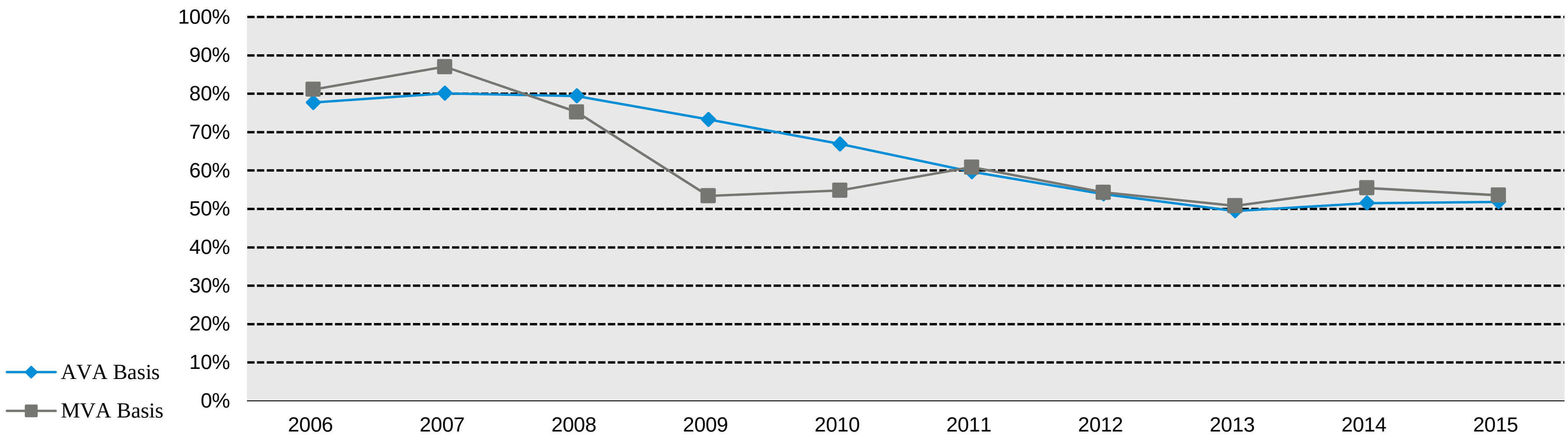


EXHIBIT III

Projection of Contributions, Liabilities, and Assets

Based on the results of the June 30, 2015, actuarial valuation, we have projected valuation results for a 44-year period commencing with Fiscal Year 2016. We have based Board of Education contributions on the contribution requirements on the funding provision of Public Act 96-0889.

For purposes of the projections, all assets, contributions, and benefit payments, including amounts attributable to the retiree health insurance program, have been included. Our projections of contributions, liabilities, and assets are based on the actuarial assumptions, membership data and benefit provisions that were used for the regular actuarial valuation.

In order to determine projected contributions, liabilities, and assets, certain calculations needed to be made that are not normally required in a regular actuarial valuation. Benefit payout requirements, actuarial liabilities, and payroll were estimated over the 44-year period from 2016 through 2059 by projecting the membership of the Fund over the 44-year period, taking into account the impact of new entrants into the Fund over the 44-year period.

To make the required projections, assumptions needed to be made regarding the age and salary distribution of new entrants as well as the size of the active membership of the Fund. The assumptions regarding the profile of new entrants to the Fund were based on the recent experience of the Fund with regard to new entrants. The size of the active membership of the Fund was assumed to remain constant over the 44-year projection period. The results of our projections are shown on the following pages.

EXHIBIT III (continued)

Projection of Contributions, Liabilities, and Assets

(Board of Education contributions are based on Public Act 96-0889)
(All dollar amounts are in millions. Actuarial Liability and asset figures as of end of year.)

Fiscal Year	Employee Contributions	Required Employer Contributions	Additional State Contributions	Additional Board of Education Contributions[1]	Required Board of Education Contributions[1]	Pensionable Payroll	Total Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability	Funded Ratio
2016	195.3	700.1	12.1	12.9	675.1	2,322.2	20,434.8	10,872.3	9,562.5	53.2%
2017	201.6	745.4	12.2	13.0	720.2	2,396.8	20,935.3	11,329.7	9,605.6	54.1%
2018	208.1	769.6	12.6	13.4	743.6	2,474.6	21,456.1	11,571.2	9,884.9	53.9%
2019	214.8	794.2	13.0	13.8	767.3	2,553.7	21,997.3	11,918.4	10,078.9	54.2%
2020	221.5	819.0	13.4	14.3	791.4	2,633.6	22,559.9	12,284.6	10,275.3	54.5%
2021	228.3	844.3	13.8	14.7	815.7	2,714.8	23,144.4	12,675.6	10,468.9	54.8%
2022	235.2	869.5	14.2	15.2	840.1	2,795.8	23,752.7	13,096.5	10,656.2	55.1%
2023	242.0	894.6	14.6	15.6	864.4	2,876.8	24,386.6	13,548.2	10,838.4	55.6%
2024	248.8	919.8	15.0	16.0	888.7	2,957.7	25,047.4	14,032.7	11,014.7	56.0%
2025	255.5	944.5	15.4	16.5	912.6	3,037.2	25,734.7	14,550.0	11,184.7	56.5%
2026	261.8	968.0	15.8	16.9	935.3	3,112.6	26,447.7	15,098.8	11,349.0	57.1%
2027	267.8	990.2	16.2	17.3	956.7	3,184.0	27,185.8	15,678.0	11,507.8	57.7%
2028	273.6	1,011.5	16.5	17.6	977.3	3,252.5	27,948.8	16,287.5	11,661.3	58.3%
2029	279.2	1,032.3	16.9	18.0	997.4	3,319.3	28,734.6	16,926.2	11,808.4	58.9%
2030	284.6	1,052.3	17.2	18.3	1,016.8	3,383.8	29,541.2	17,592.9	11,948.4	59.6%
2031	289.9	1,071.8	17.5	18.7	1,035.6	3,446.4	30,366.9	18,286.6	12,080.2	60.2%
2032	295.0	1,090.9	17.8	19.0	1,054.0	3,507.7	31,209.9	19,007.0	12,202.9	60.9%
2033	300.1	1,109.7	18.1	19.3	1,072.2	3,568.3	32,067.0	19,752.4	12,314.6	61.6%
2034	305.0	1,127.8	18.4	19.7	1,089.7	3,626.6	32,935.9	20,521.8	12,414.1	62.3%
2035	309.7	1,145.2	18.7	20.0	1,106.5	3,682.4	33,811.3	21,311.7	12,499.7	63.0%
2036	314.2	1,161.5	19.0	20.2	1,122.3	3,735.0	34,687.6	22,117.7	12,569.9	63.8%
2037	318.3	1,176.9	19.2	20.5	1,137.1	3,784.4	35,559.1	22,936.4	12,622.8	64.5%

[1] *The Board of Education contributions for a given year are equal to the sum of the Additional Board of Education Contributions and the Required Board of Education Contributions. Any contributions by the State of Illinois (other than the Additional State Contributions shown above) are to be credited against the Required Board of Education Contributions.*

EXHIBIT III (continued)

Projection of Contributions, Liabilities, and Assets

(Board of Education contributions are based on Public Act 96-0889)
(All dollar amounts are in millions. Actuarial Liability and asset figures as of end of year.)

Fiscal Year	Employee Contributions	Required Employer Contributions	Additional State Contributions	Additional Board of Education Contributions[1]	Required Board of Education Contributions[1]	Pensionable Payroll	Total Actuarial Liability	Actuarial Value of Assets	Unfunded Actuarial Liability	Funded Ratio
2038	322.2	1,191.2	19.5	20.8	1,150.9	3,830.3	36,418.7	23,762.4	12,656.3	65.2%
2039	325.8	1,204.5	19.7	21.0	1,163.8	3,873.2	37,258.1	24,589.5	12,668.6	66.0%
2040	329.1	1,216.6	19.9	21.2	1,175.5	3,912.2	38,069.2	25,411.3	12,657.9	66.8%
2041	332.1	1,227.8	20.1	21.4	1,186.3	3,948.0	38,844.6	26,222.3	12,622.2	67.5%
2042	334.9	1,238.1	20.2	21.6	1,196.3	3,981.4	39,572.3	27,014.1	12,558.3	68.3%
2043	337.3	1,246.9	20.4	21.7	1,204.8	4,009.6	40,245.7	27,781.0	12,464.8	69.0%
2044	339.5	1,255.2	20.5	21.9	1,212.8	4,036.2	40,862.0	28,521.5	12,340.4	69.8%
2045	341.9	1,264.1	20.7	22.0	1,221.4	4,064.7	41,414.4	29,232.5	12,181.9	70.6%
2046	344.4	1,273.2	20.8	22.2	1,230.2	4,094.1	41,907.5	29,918.6	11,988.8	71.4%
2047	347.5	1,284.7	21.0	22.4	1,241.3	4,131.1	42,342.8	30,585.1	11,757.7	72.2%
2048	351.1	1,298.0	21.2	22.6	1,254.2	4,174.0	42,728.9	31,242.4	11,486.5	73.1%
2049	355.4	1,314.2	21.5	22.9	1,269.8	4,225.9	43,073.1	31,901.5	11,171.6	74.1%
2050	360.5	1,333.0	21.8	23.2	1,288.0	4,286.4	43,381.5	32,572.6	10,809.0	75.1%
2051	366.3	1,354.4	22.1	23.6	1,308.7	4,355.2	43,660.0	33,266.2	10,393.8	76.2%
2052	372.7	1,378.0	22.5	24.0	1,331.5	4,431.1	43,909.9	33,990.3	9,919.5	77.4%
2053	379.2	1,401.9	22.9	24.4	1,354.6	4,508.0	44,133.1	34,750.4	9,382.8	78.7%
2054	386.1	1,427.4	23.3	24.9	1,379.1	4,589.8	44,333.9	35,555.5	8,778.4	80.2%
2055	393.4	1,454.6	23.8	25.4	1,405.5	4,677.5	44,513.8	36,413.2	8,100.6	81.8%
2056	401.3	1,483.6	24.3	25.9	1,433.5	4,770.8	44,681.7	37,338.6	7,343.1	83.6%
2057	409.6	1,514.3	24.8	26.4	1,463.1	4,869.2	44,843.7	38,345.5	6,498.2	85.5%
2058	418.0	1,545.4	25.3	26.9	1,493.2	4,969.3	45,009.3	39,450.2	5,559.2	87.6%
2059	426.5	1,577.0	25.8	27.5	1,523.8	5,071.1	45,188.6	40,669.7	4,518.9	90.0%

[1]The Board of Education contributions for a given year are equal to the sum of the Additional Board of Education Contributions and the Required Board of Education Contributions. Any contributions by the State of Illinois (other than the Additional State Contributions shown above) are to be credited against the Required Board of Education Contributions.

EXHIBIT IV

Actuarial Assumptions and Actuarial Cost Method

Rationale for Assumptions:	The information and analysis used in supporting each assumption that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Review dated September 13, 2013. Current data is reviewed in conjunction with each annual valuation. Based on professional judgment, no assumption changes are warranted at this time.
Mortality Rates:	
Healthy:	The RP-2000 Combined Healthy Mortality Table, set back 2 years with generational improvement from 2004 using Scale AA (adopted June 30, 2013).
Disabled:	The RP-2000 Disabled Mortality Table, set back 3 years (adopted June 30, 2013).
	The mortality tables specified above without future generational improvement reasonably reflect the projected mortality experience of the Fund as of the measurement date. The healthy mortality table was then adjusted to future years using additional generational improvement using Scale AA to anticipate future mortality improvement.

Termination Rates:

Select and ultimate termination rates were based on recent experience of the Fund (adopted June 30, 2013). Ultimate rates after the tenth year are shown for sample ages in the second table below. Select rates are as follows:

Years of Service	Rate (%)
Less than 1	25.0
1 - 1.99	15.0
2 - 2.99	10.0
3 - 3.99	9.0
4 - 4.99	8.0
5 - 5.99	7.0
6 - 6.99	6.0
7 - 7.99	5.0
8 - 8.99	4.5
9 - 9.99	4.0

	Rate (%)
Age	10+ Years of Service
30	2.5
35	2.5
40	2.3
45	2.0
50	2.0
55	2.0

Retirement Rates:

For employees first hired prior to January 1, 2011, rates of retirement for each age from 55 to 75 were based on the recent experience of the Fund (adopted June 30, 2013). Sample rates are shown below.

	Rate (%)	
Age	<34 Years of Service	34+ Years of Service
55	5.0	20.0
60	9.0	22.5
65	15.0	25.0
70	20.0	30.0
75	100.0	100.0

For employees first hired on or after January 1, 2011, rates of retirement for each age from 62 to 75 were used (adopted June 30, 2011). Sample rates are shown below.

Age	Rate (%)
62	40.0
64	25.0
67	30.0
70	20.0
75	100.0

Disability Rates:

Disability rates, based on the recent experience of the Fund, were applied to members with at least ten years of service (adopted June 30, 2013). All disabilities are assumed to be non-duty disabilities. Sample rates are shown below.

Age	Rate (%)
30	0.06
40	0.08
50	0.16
60	0.20

Salary Increases:

Assumed salary increases were based on the recent experience of the Fund (adopted June 30, 2013). Sample rates are shown below.

Age	Rate (%)
25	10.8
30	7.3
35	7.3
40	5.8
45	5.3
50	4.8
55	4.3

Valuation of Inactive Vested Participants:

The account balance is projected to retirement (age 62) with interest, converted to an annuity, and loaded by 35%.

Unknown Data for Participants:

Same as those exhibited by Participants with similar known characteristics. If not specified, Participants are assumed to be female.

Spouses:

Demographic data was available for spouses of current retirees. For future retirees, 80% of participants are assumed to be married, with husbands two years older than their wives. Upon the death of the retiree, 20% of surviving spouses are assumed to elect health coverage (adopted June 30, 2013).

Health Coverage Election:	75% of future female retirees under age 65 and 60% of future male retirees under age 65 were assumed to elect health and welfare coverage. 80% of future female retirees age 65 and greater and 65% of future male retirees age 65 and greater were assumed to elect health and welfare coverage. This assumption was also applied to retirees currently receiving COBRA reimbursement. Of current retirees under age 65 who are not currently participating, 20% of females and 12.5% of males were assumed to elect health and welfare coverage at age 65 (adopted June 30, 2013). Of current and future terminated participants with 10 or more years of service, 15% were assumed to meet eligibility requirements and elect health coverage (adopted June 30, 2013). Terminated participants with less than 10 years of service were assumed not to participate. Terminated employees first hired prior to January 1, 2011 were assumed to retire at age 60 with 20 or more years of service, or at age 62. Terminated employees first hired on or after January 1, 2011 were assumed to retire at age 65 (adopted June 30, 2012).
Per Capita Cost Development:	Per capita claims costs were based on the average retiree premiums and Part A and B reimbursements as of January 1, 2015, and average rebates paid in year ended June 30, 2015 (assumed to have been incurred relatively evenly between calendar year 2013 and calendar year 2014). Averages were calculated separately for retirees under and over age 65. The averages were trended to the midpoint of the valuation year at assumed trend rates. Actuarial factors were then applied to the average cost to estimate individual retiree and spouse costs by age and by gender.

Per Capita Health Costs:

Average claims for the plan year beginning July 1, 2015 are shown in the table below for retirees at selected ages. Costs shown are total costs; plan pays 50%.

	Retiree		Spouse	
Age	Male	Female	Male	Female
55	$12,380	$12,781	$9,743	$11,035
60	14,702	13,777	13,043	12,799
64	16,867	14,615	16,466	14,405

	Participant with a pension effective date prior to January 1, 2016		Participant with a pension effective date after January 1, 2016	
Age	Male	Female	Male	Female
65	5,574	4,738	4,991	4,242
70	6,460	5,106	5,785	4,572
75	6,962	5,496	6,234	4,921

Health Care Cost Trend Rates:

Health care trend measures the anticipated overall rate at which health plan costs are expected to increase in future years.

Year Ending June 30	Rate (%)
2016	8.0
2017	7.5
2018	7.0
2019	6.5
2020	6.0
2021	5.5
2022 & Later	5.0

The trend rate assumptions were developed using Segal's internal guidelines, which are established each year using data sources such as the 2015 Segal Health Trend Survey, internal client results, trends from other published surveys prepared by the S&P Dow Jones Indices, consulting firms and brokers, and CPI statistics published by the Bureau of Labor Statistics.

Net Investment Return:	7.75% per year (adopted June 30, 2013). The net investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgement. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Fund's target asset allocation.
GASB 43 Discount Rate:	4.50% per year, based on the expected rate of return on day-to-day employer funds.
GASB 67 Discount Rate:	7.75% per year
Inflation:	2.75% per year (adopted June 30, 2013)
Payroll Growth:	3.50% per year (adopted June 30, 2013)
Administrative Expenses:	Equal to actual expenses for the prior year, increased by 5%. Future expenses are assumed to grow at 5% per year.
Total Service at Retirement:	Total service at retirement is assumed to be 103.3% of the teacher's regular period of service at retirement.
Actuarial Value of Assets:	For funding purposes, the actuarial value of assets was determined by smoothing unexpected gains and losses over a period of 4 years. The 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% of the calculated gain (or loss) in the prior 4 years. For GASB purposes, the actuarial value of assets is equal to the market value of assets.

Actuarial Cost Method:	Projected Unit Credit (adopted August 31, 1991) is used for funding and GASB 43 purposes. Under this method, the projected benefits of each individual included in the valuation are allocated by a consistent formula to valuation years. The actuarial present value of benefits allocated to a valuation year is called the normal cost. The actuarial present value of benefits allocated to all periods prior to a valuation year is called the accrued liability. Entry Age is used for GASB 67 purposes. Under this method, a normal cost is calculated for each employee that is the level annual contribution as a percent of pay required to be made from the employee's date of hire for as long as he/she remains active so that sufficient assets will be accumulated to provide his/her benefit. The accrued liability is the difference between the present value of all future benefits and the present value of all future normal costs.
OPEB Plan Design:	Development of plan liabilities was based on the substantive plan of benefits in effect as described in Exhibit V and on the established pattern or practice with regard to sharing of benefit costs between the employer and plan members. In particular, this valuation under GASB 43 does not take into account the current $65 million maximum of annual payments that may be paid from the Fund, as there has been a history of increases in the annual dollar maximum. The valuation includes recognition of the excise tax. The applicable annual limitation used to determine the estimated amount of excise tax is assumed to increase 2.75% per year beginning in 2019. The effect on the obligation of other future aspects of the Patient Protection and Affordable Care Act (PPACA) and the Health Care and Education Reconciliation Act (HCERA) of 2010 are assumed to be *de minimis*.

EXHIBIT V

Summary of Plan Provisions

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

Membership:	Any teacher and certain other employees of the Chicago Public Schools, approved charter schools, and the Chicago Teachers' Pension Fund are participants of this pension fund.
Employee Contributions:	All participants of the Fund are required to contribute 9% of salary to the Fund as follows: 7.5% for the retirement pension, 1% for the spouse's pension, and 0.5% for the automatic increases in the retirement pension. As of September 1981, the Board of Education has been paying 7% of the required teacher contributions for Chicago public school teachers. Charter school contributions may be contributed at various rates by the employers and teachers.
Service Retirement Pension:	a. Eligibility – An employee may retire at age 55 with at least 20 years of service or at age 62 with 5 years of service. If retirement occurs before age 60, the service retirement pension is reduced ½ of 1% of each month that the age of the member is below 60. However, there is no reduction if the employee has at least 34 years of service. b. Amount – For service earned before July 1, 1998, the amount of the service retirement pension is 1.67% of highest average salary for the first 10 years, 1.90% for each of the next 10 years, 2.10% for each of the following 10 years, and 2.30% for each year above 30. For service earned after June 30, 1998, the amount of the service retirement pension is 2.2% of highest average salary for each year of service. Service earned before July 1, 1998 can be upgraded to the 2.2% formula through the payment of additional employee contributions of 1% of the teacher's highest salary within the last four years for each year of prior service, up to a maximum of 20%, 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 employee has at least 30 years of service. The highest average salary is the average of the 4 highest consecutive years of salary within the last 10 years. The maximum pension payable is 75% of the highest annual salary or $1,500 per month, whichever is greater. An employee who first becomes a participant on or after January 1, 2011 is subject to the following provisions: 1. The highest salary for annuity purposes is equal to the average monthly salary obtained by dividing the participant's total salary during the 96 consecutive months of service within the last 120 months of service in which the total compensation was the highest by the number of months in that period. 2. For 2015, the salary is limited to $111,572, as determined by the Illinois Department of Insurance. The limit for future years shall automatically be increased by the lesser of 3% or one-half the percentage change in the Consumer Price Index-U during the preceding calendar year. 3. A participant is eligible to retire with unreduced benefits after attainment of age 67 with at least 10 years of service credit. However, a participant may elect to retire at age 62 with at least 10 years of service credit and receive a retirement annuity reduced by ½ of 1% for each month that the age of the member is below 67.
Post-Retirement Increase:	An annuitant is entitled to automatic annual increases of 3% of the current pension starting the later of attainment of age 61 and receipt of one year's pension payments. Automatic annual increases in the retirement annuity for employees who first become a participant on or after January 1, 2011 is equal to the lesser of 3% or one-half the annual change in the Consumer Price Index-U, whichever is less, based on the originally granted retirement annuity. This automatic annual increase starts the later of attainment of age 67 and receipt of one year's pension payments.

Survivor's Pension:	A surviving spouse or unmarried minor child is entitled to a pension upon the death of an employee while in service or on retirement. The minimum survivor's pension is 50% of the deceased employee's or retired employee's pension at the date of death. If the 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. Survivor's pensions are subject to annual increases of 3% 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. For employees who first become a participant on or after January 1, 2011, the initial survivor's pension is equal to 66 2/3% of the participant's earned retirement annuity at the date of death, subject to automatic annual increases of the lesser of 3% or one-half of the increase in the Consumer Price Index-U during the preceding calendar year, based on the originally granted survivor's annuity. This automatic annual increase starts the later of when the member would have attained age 67 and receipt of one year's pension payments.
Single Sum Death Benefit:	Upon the death of an employee in service, a refund equal to the total contributions less contributions for survivor's pensions is payable. A death benefit is payable upon the death of an employee in service in addition to any other benefits payable to the surviving spouse or minor children. The death benefit payable is the lesser of $10,000 and salary earned for the most recent six months. Upon the death of a retired member, the death benefit is the lesser of $10,000 and the most recent salary earned for a 6 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 Benefit:	A non-duty disability pension is payable in the event of total or permanent disability with 10 or more years of service. 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 ½ of 1% for each month that the age of the member is below 55 down to a minimum age of 50, but not less than the unreduced service retirement pension with 20 years of service.

Duty Disability Benefit:	Upon disability resulting from an injury incurred while working, an employee is entitled to a disability benefit of 75% of final average salary until age 65. At age 65, the disabled employee shall receive a service retirement pension, which includes service earned while disabled.
Refunds:	An employee who terminates employment before qualifying for a pension is entitled to a refund of employee contributions, without interest. An employee who is unmarried at date of retirement is entitled to a refund of the full amount contributed for the survivor's pension, without interest.
Retiree Health Insurance:	Partial reimbursement of the cost of health insurance coverage, which may be in the form of an annual direct payment or a reduction in the amount deducted from the monthly annuity. Effective January 1, 2015, the Board provides reimbursement of 50% of the cost of pensioners' health insurance coverage. Beginning in 2015, the maximum reimbursement for non-Chicago Teachers' Pension Fund plans will be limited to an amount based on the most economical Chicago Teachers' Pension Fund plan option. The total amount of payments in any year may not exceed 75% of the total cost of health insurance coverage in that year for all recipients who receive payments in that year. Total payments may not exceed $65,000,000 plus any amount that was authorized to be paid in the preceding year but was not actually paid (including any interest earned).
Plan Year:	July 1 through June 30
Changes in Plan Provisions:	Medicare Part A payments are not subsidized for members with a pension benefit commencement date of July 1, 2016 or later.

EXHIBIT 1

GASB 67 Net Pension Liability

The components of the net pension liability at June 30, 2015, were as follows:

Total pension liability	$20,713,217,296
Plan fiduciary net position	10,689,954,320
Net pension liability	10,023,262,976
Plan fiduciary net position as a percentage of the total pension liability	51.61%

Actuarial assumptions. The total pension liability was determined by an actuarial valuation as of June 30, 2015, using the following actuarial assumptions, applied to all periods included in the measurement:

Inflation	2.75%
Salary increases	4.25% to 15.75%, varying by age
Investment rate of return	7.75%, net of investment expense
Cost of living adjustments	3% compound for Tier 1 participants; the lesser of 3% or one-half of CPI, simple, for Tier 2 participants

For healthy participants, mortality rates were based on the RP-2000 Healthy Mortality Table for Males or Females, as appropriate, set back 2 years and adjusted for mortality improvements generationally from 2004 based on Scale AA. For disabled participants, mortality rates were based on the RP-2000 Disabled Mortality Table, set back 3 years.

The actuarial assumptions used in the June 30, 2015, valuation were based on the results of an experience study for the period July 1, 2007, through June 30, 2012.

Discount rate: The discount rate used to measure the total pension liability was 7.75%. The projection of cash flows used to determine the discount rate assumed plan member contributions will be made at the current contribution rate and that employer contributions will be made as specified by Public Act 96-0889. Based on those assumptions, the pension fund's fiduciary net position was projected to be available to make all projected future benefit payments of current fund participants. Therefore, the long-term expected rate of return on pension fund investments was applied to all periods of projected benefit payments to determine the total pension liability.

Sensitivity of the net pension liability to changes in the discount rate. The following presents the net pension liability as of June 30, 2015, calculated using the discount rate of 7.75%, as well as what the net pension liability would be if it were calculated using a discount rate that is 1-percentage-point lower (6.75%) or 1-percentage-point higher (8.75%) than the current rate:

	1% Decrease (6.75%)	Current Discount (7.75%)	1% Increase (8.75%)
Net pension liability as of June 30, 2015	$12,677,155,748	$10,023,262,976	$7,826,251,619

EXHIBIT 2

GASB 67 Schedules of Changes in Net Pension Liability

	2015	2014
Total pension liability		
Service cost	$318,734,274	$332,188,481
Interest	1,547,663,416	1,509,307,860
Change of benefit terms	0	0
Differences between expected and actual experience	(138,512,940)	(14,177,102)
Changes of assumptions	0	0
Benefit payments, including refunds of employee contributions	(1,331,567,406)	(1,306,341,856)
Net change in total pension liability	$396,317,344	$520,977,383
Total pension liability – beginning	20,316,899,952	19,795,922,569
Total pension liability – ending (a)	$20,713,217,296	$20,316,899,952
Plan fiduciary net position		
Contributions – employer	$643,667,000	$585,416,141
Contributions – employee	191,233,298	187,846,065
Net investment income	381,688,430	1,685,079,840
Benefit payments, including refunds of employee contributions	(1,331,567,406)	(1,306,341,856)
Administrative expense	(11,705,562)	(10,494,139)
Other	943,946	0
Net change in plan fiduciary net position	($125,740,294)	$1,141,506,051
Plan fiduciary net position – beginning	10,815,694,614	9,674,188,563
Plan fiduciary net position – ending (b)	$10,689,954,320	$10,815,694,614
Fund's net pension liability – ending (a) – (b)	$10,023,262,976	$9,501,205,338
Plan fiduciary net position as a percentage of the total pension liability	51.61%	53.23%
Covered employee payroll	$2,273,551,432	$2,233,280,995
Fund's net pension liability as percentage of covered employee payroll	440.86%	425.44%

EXHIBIT 3

GASB 67 Schedule of Employer Contribution – Last Ten Fiscal Years

Year Ended June 30	Actuarially Determined Contributions	Contributions in Relation to the Actuarially Determined Contributions	Contribution Deficiency (Excess)	Covered Actual Employee Payroll	Contributions as a Percentage of Covered Employee Payroll
2006	$328,365,821	$52,789,706	$275,576,115	$1,944,358,215	2.72%
2007	311,139,800	103,761,750	207,378,050	1,863,182,086	5.57%
2008	290,072,885	164,270,412	125,802,473	1,914,558,916	8.58%
2009	292,145,359	198,069,327	94,076,032	1,996,194,224	9.92%
2010	355,846,125	290,759,950	65,086,175	2,107,934,080	13.79%
2011	430,091,545	143,589,994	286,501,551	2,090,131,858	6.87%
2012	510,101,466	138,729,011	371,372,455	2,224,903,121	6.24%
2013	585,444,539	142,654,000	442,790,539	2,239,347,051	6.37%
2014	719,781,746	585,416,141	134,365,605	2,233,280,995	26.21%
2015	728,488,520	643,667,000	84,821,520	2,273,551,432	28.31%

Notes to EXHIBIT 3

Valuation date	Actuarially determined contribution amount is determined as of June 30, with appropriate interest to the end of the year.
Methods and assumptions used to establish "actuarially determined contribution" rates:	
Actuarial cost method	Projected Unit Credit cost method
Amortization method	30-year closed effective July 1, 2013 (28 years remaining), level percentage of salary amortization
Asset valuation method	4-year smoothed market
Actuarial assumptions:	
Investment rate of return	7.75%, net of investment expense
Projected salary increases	4.25% to 15.75%, varying by age
Mortality	For healthy participants, mortality rates were based on the RP-2000 Healthy Mortality Table for Males or Females, as appropriate, set back 2 years and adjusted for mortality improvements generationally from 2004 based on Scale AA. For disabled participants, mortality rates were based on the RP-2000 Disabled Mortality Table, set back 3 years.
Cost of living adjustments	3% compound for Tier 1 participants; the lesser of 3% or one-half of CPI, simple, for Tier 2 participants

EXHIBIT 4

GASB 43 Summary of Required Supplementary Information

Valuation date	June 30, 2015
Actuarial cost method	Projected Unit Credit cost method
Amortization method	Level percent of payroll, 30-year closed effective July 1, 2013
Remaining amortization period	28 years as of June 30, 2015
Asset valuation method	Market
Actuarial assumptions:	
Investment rate of return	4.50%
Inflation rate	2.75%
Medical cost trend rate	8.00% graded to 5% over 6 years

EXHIBIT 5
OPEB Solvency Test

	June 30, 2015	June 30, 2014
1. Actuarial accrued liability (AAL)		
a. Active member contributions	$0	$0
b. Retirees and beneficiaries	1,064,847,161	1,067,009,286
c. Active and inactive members (employer financed)	846,144,830	871,846,609
d. Total	$1,910,991,991	$1,938,855,895
2. Actuarial value of assets	21,713,159	35,977,444
3. Unfunded actuarial accrued liability (UAAL)	$1,889,278,832	$1,902,878,451
3. Cumulative portion of AAL covered		
a. Active member contribution	100.0%	100.0%
b. Retirees and beneficiaries	2.04%	3.37%
c. Active and inactive members (employer financed)	0.00%	0.00%

EXHIBIT 6

GASB 43 Required Supplementary Information – Determination of Annual Required Contribution (ARC)

		July 1, 2015		July 1, 2014	
	Cost Element	**Amount**	**% of Payroll**	**Amount**	**% of Payroll**
1.	Normal cost	$58,909,640	2.54%	$60,899,465	2.63%
2.	Amortization of the unfunded actuarial accrued liability	76,595,633	3.30%	74,829,312	3.23%
3.	Total Annual Required Contribution (ARC)	$135,505,273	5.84%	$135,728,777	5.86%
4.	Projected payroll	$2,322,254,343		$2,316,336,417	

EXHIBIT 7

GASB 43 Required Supplementary Information – Schedule of Employer Contributions

Fiscal Year Ending June 30,	Annual Required Contributions (ARC)	Actual Contributions	Percentage Contributed
2007	$209,446,107	$65,000,000	31.03%
2008	150,033,070	65,000,000	43.32%
2009	171,880,428	65,000,000	37.82%
2010	186,231,574	65,000,000	34.90%
2011	215,797,617	65,000,000	30.12%
2012	218,842,221	65,000,000	29.70%
2013	216,163,148	65,000,000	30.07%
2014	165,115,403	65,000,000	39.37%
2015	135,728,777	65,000,000	47.89%

EXHIBIT 8

GASB 43 Required Supplementary Information – Schedule of Funding Progress

Fiscal Year Ending June 30,	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) (b)	[Assets as a % of Actuarial Liability] Funded Ratio (c) = (a) / (b)	Unfunded AAL (UAAL) (d) = (b) - (a)	Active Member Payroll (e)	UAAL as a % of Active Member Payroll (f) = (d)/(e)
2006	$41,057,585	$2,373,773,770	1.73%	$2,332,716,185	$1,944,358,215	119.97%
2007	47,401,758	2,022,007,643	2.34%	1,974,605,885	1,863,182,086	105.98%
2008	44,989,385	2,407,122,492	1.87%	2,362,133,107	1,914,558,916	123.38%
2009	49,691,750	2,670,282,662	1.86%	2,620,590,912	1,996,194,224	131.28%
2010	34,857,732	2,864,877,305	1.22%	2,830,019,573	2,107,934,080	134.26%
2011	31,324,572	3,071,516,739	1.02%	3,040,192,167	2,090,131,858	145.45%
2012	34,124,958	3,110,316,263	1.10%	3,076,191,305	2,224,903,121	138.26%
2013	35,796,904	2,386,105,927	1.50%	2,350,309,023	2,239,347,051	104.96%
2014	35,977,444	1,938,855,895	1.86%	1,902,878,451	2,233,280,995	85.21%
2015	21,713,159	1,910,991,991	1.14%	1,889,278,832	2,155,604,327	87.64%

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