

**TEACHERS' PENSION AND ANNUITY FUND
OF NEW JERSEY**

June 30, 2017 Actuarial Valuation Report
Prepared as of July 1, 2017
(Revised)



1550 Liberty Ridge Drive
Suite 200
Wayne, PA 19087-5572
USA

Tel +1 610 687.5644
Fax +1 610.687.4236

www.milliman.com

April 6, 2018

Board of Trustees
Teachers' Pension and Annuity Fund of New Jersey
State of New Jersey
Department of the Treasury
Division of Pensions and Benefits, CN 295
Trenton, NJ 08625-0295

Ladies and Gentlemen:

This revised report presents the results of the actuarial valuation of Teachers' Pension and Annuity Fund of New Jersey as of June 30, 2017. The report has been revised to reflect a change in the investment return assumption, which is set by the State Treasurer, from 7% to 7.5% for this valuation. The State Treasurer has indicated that the assumption will be subsequently reduced to 7.3% in the June 30, 2019 actuarial valuation and further reduced to 7% in the June 30, 2021 actuarial valuation. The assumption used in the prior year was 7.65%. Section I contains highlights of the valuation including a general discussion and comments on the various schedules included in the report. The subsequent Sections contain schedules summarizing the underlying calculations, asset information, participant data, plan benefits and actuarial assumptions.

Purpose

The main purposes of this report are:

- to provide the annual state contribution in accordance with N.J. Statutes to be made in the Fiscal Year ending June 30, 2019 which represents the contribution for the valuation year beginning July 1, 2017;
- to determine the Target Funded Ratio as of July 1, 2017 in accordance with N.J. Statutes to potentially provide for the formation of a special pension committee;
- to review the experience under the plan for the valuation year ending June 30, 2017.

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Actuarial computations presented in this report are for purposes of determining the statutory contribution amounts and Target Funded Ratio for TPAF. Actuarial computations under GASB Statements No. 67 and No. 68 are provided in a separate report and are for purposes of assisting TPAF and participating employers in fulfilling their financial accounting requirements. The computations prepared for these two purposes may differ. The calculations in the enclosed report have been made on a basis consistent with our understanding of the N.J. statutes. Determinations for purposes other than these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

Milliman's work is prepared solely for the use and benefit of the Teachers' Pension and Annuity Fund ("System") for the State of New Jersey Division of Pension and Benefits. To the extent that Milliman's work is not subject to disclosure under applicable public records laws, Milliman's work may not be provided to third parties without Milliman's prior written consent. Milliman does not intend to benefit or create a legal duty to any third party recipient of its work product. Milliman's consent to release its work product to any third party may be conditioned on the third party signing a Release, subject to the following exception:

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No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are pension actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

Data Reliance

In preparing this report, we relied, without audit, on statutory provisions, member census data, plan provisions, asset statements and other information (both written and oral) provided by the State of New Jersey Division of Pensions and Benefits. We have not audited or verified the census data, asset statements or other information. To the

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extent any of these are inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete.

We performed a limited review of the data used directly in our analysis for reasonableness and consistency and have not found material defects in the data. If there are material defects in the data, it is possible that they would be uncovered by a detailed, systematic review and comparison of the data to search for data values that are questionable or for relationships that are materially inconsistent. Such a review was beyond the scope of our assignment.

Future Measurements

This valuation report is only an estimate of TPAF's financial condition as of a single date. It can neither predict the System's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of TPAF benefits, only the timing of TPAF contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct. Determining results using alternative assumptions is outside the scope of our engagement.

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; changes in actuarial methods; and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The Board and State Treasurer have the final decision regarding the appropriateness of the assumptions and actuarial cost methods.

Certification

We hereby certify that, to the best of our knowledge, this report, including all costs and liabilities based on actuarial assumptions and methods adopted by the Board or mandated by statute, is complete and accurate and determined in conformance with generally recognized and accepted actuarial principles and practices, which are consistent with the Actuarial Standards of Practice promulgated by the Actuarial Standards Board and the applicable Guides to Professional Conduct, amplifying Opinions and supporting Recommendations of the American Academy of Actuaries.

In compliance with New Jersey statute, this actuarial valuation is based on an investment return assumption of 7.5%. This rate is 15 basis points lower than the assumption of 7.65% used in the July 1, 2016 valuation and 40 basis points lower than the assumption used in the July 1, 2015 valuation. The investment return assumption is specified by the State Treasurer and is considered a *prescribed assumption* as defined by Actuarial Standard of Practice No. 27 (ASOP 27). The State Treasurer has further indicated that the assumption will be reduced to 7.3% in the July 1, 2019 actuarial valuation and reduced to 7% in the July 1, 2021 actuarial valuation. Based on information provided by the Division of Investment and its team of outside consultants, the development of the ultimate 7% assumption appears to be in accordance with ASOP 27. The 5-year select period for the reduction to the ultimate assumption is to allow contributing employers to all the State retirement systems the ability to budget for the anticipated increase in contribution requirements due to the decrease in the interest rate assumption.

Using Milliman's capital market outlook model as of June 30, 2017 and the State's asset allocation for fiscal year 2018, the ultimate assumption of 7% is anticipated to be achieved approximately 45% of the time based on projected 30-year annualized returns. The reduction in the investment return assumption over the prior two actuarial valuations and reductions indicated by the State Treasurer in future valuations significantly increases the expectation that the assumed rate of return will be earned over time. For comparison purposes, the Milliman capital market outlook model would anticipate a 7.5% investment return assumption be achieved approximately 1/3rd of the time, a 7.65% investment return assumption be achieved slightly less than 1/3rd of the time and a 7.90% investment return assumption be achieved approximately 1/4th of the time. It is important to keep in mind that capital market models are updated no less than annually as financial markets evolve and/or the asset allocation is modified. There is no guarantee that a 7% assumption to be used in the July 1, 2021 actuarial valuation would reflect a reasonable assumption in accordance with actuarial standards of practice at that time. This assumption should continue to be monitored and modified at future valuation dates as warranted.

This actuarial valuation is based on the asset valuation method in compliance with New Jersey Statute. This method recognizes 20% of the difference between the market value of assets and the actuarial value of assets. Per Actuarial Standards of Practice (ASOP) No. 44, a reasonable asset valuation method produces values within a sufficiently narrow range around market value or recognizes differences from market value in a sufficiently short period. As of June 30, 2017, the Actuarial Value of Assets is 108.4% of market value. Investment losses have occurred each year since the July 1, 2000 actuarial valuation on an actuarial value of asset basis. Since the actuarial value of assets exceeds the market value of assets and the asset smoothing method

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recognizes investment losses slowly over time, this will continue to result in upward pressure on the statutory contribution requirements in future years.

We are members of the American Academy of Actuaries and meet its Qualification Standard to render this actuarial opinion.

Respectfully submitted,



Richard L. Gordon, F.S.A.
Member American Academy of Actuaries



Scott F. Porter, F.S.A.
Member American Academy of Actuaries

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY

A. Summary of Principal Results

	PARTICIPANT DATA			Percentage	Percentage
	June 30, 2017	June 30, 2016	June 30, 2015	Change	Change
	<u>Valuation</u>	<u>Valuation</u>	<u>Valuation</u>	<u>2016 to 2017</u>	<u>2015 to 2016</u>
Active Contributing Members					
Number	140,988	140,563	140,227	0.3 %	0.2 %
Number of Veteran Members	303	347	400	(12.7)	(13.3)
Average Pay	\$ 75,467	\$ 74,283	\$ 73,522	1.6	1.0
Total Payroll	10,639,951,412	10,441,386,406	10,309,792,863	1.9	1.3
Total Appropriation Payroll *	10,636,017,869	10,436,205,103	10,305,472,484	1.9	1.3
Avg. Member Accumulated Contributions	83,632	78,925	75,435	6.0	4.6
Total Member Accumulated Contributions	11,791,134,542	11,093,901,397	10,577,991,354	6.3	4.9
Non-Contributing Members					
Number	13,870	13,600	13,225	2.0 %	2.8 %
Number of Veteran Members	46	47	48	(2.1)	(2.1)
Number of Active Members	2,104	2,282	2,227	(7.8)	2.5
Average Pay for Active Members	\$ 64,601	\$ 64,464	\$ 64,384	0.2	0.1
Total Payroll for Active Members	135,921,046	147,107,300	143,383,785	(7.6)	2.6
Avg. Member Accumulated Contributions	48,699	45,239	41,721	7.6	8.4
Total Member Accumulated Contributions	675,452,515	615,248,682	551,754,254	9.8	11.5

* Excludes salary in excess of the Taxable Wage Base for employees hired after June 30, 2007

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY

(continued)

A. Summary of Principal Results (continued)

PARTICIPANT DATA

	<u>June 30, 2017</u>	<u>June 30, 2016</u>	<u>June 30, 2015</u>	Percentage Change	Percentage Change
	<u>Valuation</u>	<u>Valuation</u>	<u>Valuation</u>	<u>2016 to 2017</u>	<u>2015 to 2016</u>
Service Retirees, Including Domestic Relations Beneficiaries					
Number	93,659	91,721	89,092	2.1 %	3.0 %
Average Annual Pension	\$ 41,790	\$ 41,542	\$ 41,233	0.6	0.7
Total Annual Pensions	\$ 3,914,034,990	\$ 3,810,269,332	\$ 3,673,500,726	2.7	3.7
Average Retirement Age of New Retirees	62.4	62.3	62.1	0.2	0.3
Average Annual Pension of New Retirees	\$ 46,382	\$ 46,569	\$ 47,230	(0.4)	(1.4)
Disabled Retirees					
Number	3,553	3,430	3,298	3.6 %	4.0 %
Average Annual Pension	\$ 29,272	\$ 28,770	\$ 28,350	1.7	1.5
Total Annual Pensions	\$ 104,004,628	\$ 98,682,444	\$ 93,498,895	5.4	5.5
Beneficiaries and Dependents					
Number	6,316	6,095	5,840	3.6 %	4.4 %
Average Annual Pension	\$ 26,381	\$ 26,025	\$ 25,677	1.4	1.4
Total Annual Pensions	\$ 166,622,557	\$ 158,623,208	\$ 149,956,523	5.0	5.8
Terminated Vested Participants					
Number	206	222	210	(7.2) %	5.7 %
Average Annual Pension	\$ 16,048	\$ 15,669	\$ 15,006	2.4	4.4
Total Annual Pensions	\$ 3,305,904	\$ 3,478,572	\$ 3,151,200	(5.0)	10.4

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY

(continued)

A. Summary of Principal Results (continued)

STATUTORY PENSION CONTRIBUTIONS WITH BUDGET ADJUSTMENTS

	June 30, 2017	Revised June 30, 2016	June 30, 2015		
	Valuation (State's Fiscal Year 2019 Contributions)	Valuation (State's Fiscal Year 2018 Contributions)	Valuation (State's Fiscal Year 2017 Contributions)	Percentage Change 2016 to 2017	Percentage Change 2015 to 2016
Normal Contribution (1/60th formula) ¹	\$ 306,080,234	\$ 291,633,684	\$ 284,765,709	5.0 %	2.4 %
Additional Formula Contribution	73,581,961	70,807,655	71,559,513	3.9 %	(1.1) %
Accrued Liability Contribution	2,828,454,357	2,637,136,345	2,380,849,929	7.3 %	10.8 %
Lottery Contribution Offset	<u>(806,694,169)</u>	<u>(778,559,813)</u>	N/A	3.6 %	N/A %
Total Pension Contribution by Statute ²	\$ 2,401,422,383	\$ 2,221,017,871	\$ 2,737,175,151 *	8.1 %	(18.9) %
State Appropriation for Pension ³	1,118,175,762	721,229,521	1,087,919,000	55.0 %	(33.7) %
Expected Lottery Revenue ⁴	806,694,169	778,559,813	N/A	N/A %	N/A %
Percentage of Statutory Pension Contribution Appropriated With Lottery Revenue	46.6%	32.5%	39.7%	14.1 %	(7.2) %
	60.0%	50.0%	39.7%	10.0 %	10.3 %

¹ Excludes cost of non-contributory group life insurance. State reimburses TPAF for actual amounts paid.

² These amounts should be increased for assumed interest at the rate of 7.50%, 7.65%, 7.90%, per annum if payment is delayed beyond June 30, 2019, June 30, 2018 and June 30, 2017, respectively.

³ Beginning with fiscal year ending June 30, 2018, State contribution expected to be gross contribution multiplied by phase-in percentage less Lottery contribution offset. Phase-in percentage expected to increase 10% per year. A portion of the appropriation will be allocated to State ERI 3 & 5.

⁴ Provided by the State

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY

(continued)

A. Summary of Principal Results (continued)

LOCAL EMPLOYER CONTRIBUTIONS

	June 30, 2017 <u>Valuation</u>	June 30, 2016 <u>Valuation</u>	June 30, 2015 <u>Valuation</u>	Percentage Change <u>2016 to 2017</u>	Percentage Change <u>2015 to 2016</u>
Early Retirement Incentive Contributions payable April 1, 2019 April 1, 2018 and April 1, 2017, respectively					
ERI 1 - Local Employers	\$ 890,441	\$ 894,162	\$ 901,208	(0.4) %	(0.8) %
ERI 2 - Local Employers	347,758	350,348	355,700	(0.7) %	(1.5) %
ERI 4 - Local Employers	2,778,928	2,790,541	2,812,524	(0.4) %	(0.8) %
Unauthorized ERIs - Local Employers *	<u>0</u>	<u>0</u>	<u>8,393,900</u>	<u>0.0</u> %	<u>(100.0)</u> %
Total	\$ 4,017,127	\$ 4,035,051	\$ 12,463,332	(0.4) %	(67.6) %

* Per the Division, they will no longer recognize any amounts owed by Local employers due to an unauthorized ERI as receivable contributions beginning with the 2016 actuarial valuation

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY

(continued)

A. Summary of Principal Results (continued)

	ASSETS AND LIABILITIES				
	June 30, 2017	Revised June 30, 2016	June 30, 2015	Percentage Change	Percentage Change
	<u>Valuation</u>	<u>Valuation</u>	<u>Valuation</u>	<u>2016 to 2017</u>	<u>2015 to 2016</u>
Market Value of Pension Assets	\$ 24,495,303,183	\$ 23,732,571,086	\$ 26,320,738,690	3.2 %	(9.8) %
Actuarial Value of Pension Assets	26,549,410,215	27,169,758,348	28,301,404,184	(2.3) %	(4.0) %
Ratio of Actuarial Value to Market Value	108.4 %	114.5 %	107.5 %	(6.1) %	7.0 %
Special Asset Value	9,818,101,083	9,779,398,978	N/A	0.4 %	N/A %
Actuarial Accrued Pension Liability	59,954,548,700	57,865,971,163	55,359,377,071	3.6 %	4.5 %
Unfunded Pension Liability					
Based on Market Value	35,459,245,517	34,133,400,077	29,038,638,381	3.9 %	17.5 %
Based on Actuarial Value + Special Asset Value	23,587,037,402	20,916,813,837	27,057,972,887	12.8 %	(22.7) %
Funded Ratio					
Based on Market Value	40.86 %	41.01 %	47.55 %	(0.15) %	(6.54) %
Based on Actuarial Value + Special Asset Value	60.66 %	63.85 %	51.12 %	(3.19) %	12.73 %
Target Funded Ratio	80.000 %	79.286 %	78.571 %	0.71 %	0.71 %
Change in Funded Ratio since June 30, 2007, 2006 and 2005, respectively					
Based on Market Value	(32.0) %	(28.3) %	(21.5) %	(3.8) %	(6.8) %
Based on Actuarial Value + Special Asset Value	(15.3) %	(14.2) %	(29.7) %	(1.2) %	15.5 %

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY

(continued)

A. Summary of Principal Results (continued)

	RISK MEASURES				
	June 30, 2017	June 30, 2016	June 30, 2015	Percentage	Percentage
	<u>Valuation</u>	<u>Valuation</u>	<u>Valuation</u>	Change	Change
				<u>2016 to 2017</u>	<u>2015 to 2016</u>
Market Value of Pension Assets	\$ 24,495,303,183	\$ 23,732,571,086	\$ 26,320,738,690	3.2 %	(9.8) %
Annuity Savings Fund **	<u>12,531,120,389</u>	<u>11,783,696,363</u>	<u>11,199,306,391</u>	6.3 %	5.2 %
Net Market Value of Pension Assets	11,964,182,794	11,948,874,723	15,121,432,299	0.1 %	(21.0) %
Actuarial Accrued Liability (AAL) for Retirees	39,194,557,919	37,997,277,608	36,103,778,885	3.2 %	5.2 %
% of AAL for Retirees Covered by Assets *	62.5%	62.5%	72.9%	0.0 %	(10.4) %
% of AAL for Retirees Covered by Net Assets *	30.5%	31.4%	41.9%	(0.9) %	(10.5) %
Prior Year's Benefit Payments for Retirees	4,198,977,288	4,075,562,466	3,920,924,262	3.0 %	3.9 %
Ratio of Assets to Benefit Payments ^	5.8	5.8	6.7	0.0 %	(13.4) %
Ratio of Net Assets to Benefit Payments ^	2.8	2.9	3.9	(3.4) %	(25.6) %
Ratio of AAL to Benefit Payments ^	9.3	9.3	9.2	0.0 %	1.1 %

* Percentage is limited to 100%.

** Accumulated active and inactive member contributions.

^ Does not include impact of future investment income, member and State contributions, Lottery revenue and increases in benefit payments.

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments

This report summarizes the results of the actuarial valuation of the Teacher's Pension and Annuity Fund (TPAF) as of June 30, 2017, which determines the statutory contribution payable for the fiscal year ending June 30, 2019. This valuation reflects three significant changes to the determination of the statutory contribution by the State:

- 1) Chapter 83, P.L. 2016 requires statutory contributions to be made on a quarterly basis.
- 2) Chapter 98, P.L. 2017 contributes the State Lottery Enterprise to three statewide retirement systems, with TPAF receiving the majority of the proceeds, for a term of 30 years beginning with the fiscal year ending June 30, 2018.
- 3) Reduction in the investment return assumption to 7.5%. Further reductions are anticipated to be 7.3% beginning with the July 1, 2019 actuarial valuation and to 7% beginning with the July 1, 2021 actuarial valuation. These anticipated future reductions do not impact the results presented in this report.

We believe the passage of these two bills and the eventual reduction in the investment return assumption to 7% are important measures taken by the State to decrease the risk of insolvency for TPAF.

Notwithstanding these measures, the State anticipates continuation of the 10-year phase-in approach of the statutory contribution, with fiscal year 2019 being the sixth year of the phase-in. Significant increases in State contributions will still be required in the near term. If these increasing funding requirements are not met in the near term, TPAF could still be at risk of insolvency.

Please note that the first valuation impacted by the Lottery Enterprise Contribution is the July 1, 2016 actuarial valuation. As such, this report reflects revisions to the funded ratio and State contribution requirement determined as of July 1, 2016 and payable for the 2018 fiscal year, respectively, than shown in the prior valuation report.

Assumptions

This valuation reflects the actuarial assumptions based on the July 1, 2012 – June 30, 2015 Experience Study.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments (continued)

In compliance with New Jersey statute, this actuarial valuation is based on an investment return assumption of 7.5%, which is 15 basis points lower than the assumption of 7.65% used in the prior valuation. The investment return assumption is specified by the State Treasurer and is considered a *prescribed assumption* as defined by Actuarial Standard of Practice No. 27 (ASOP 27). The State Treasurer has further indicated that the assumption will be reduced to 7.3% in the July 1, 2019 actuarial valuation and reduced to 7% in the July 1, 2021 actuarial valuation. Based on information provided by the Division of Investment and its team of outside consultants, the development of the ultimate 7% assumption appears to be in accordance with ASOP 27. It is important to keep in mind that capital market models are updated no less than annually as financial markets evolve and/or the asset allocation is modified. There is no guarantee that a 7% assumption to be used in the July 1, 2021 actuarial valuation would reflect a reasonable assumption in accordance with actuarial standards of practice at that time. This assumption should continue to be monitored and modified at future valuation dates as warranted.

For a given asset allocation, the lower the investment return assumption, the higher the probability that the assumption will be realized over the long term. The determination and payment of contribution requirements of TPAF using actuarial assumptions that are more likely to be realized decreases the potential long-term risk of insolvency. The 5-year period to achieve the ultimate assumption is to allow contributing employers to all the State retirement systems the ability to budget for the additional contributions.

The reduction in the investment return assumption to 7.5% increased the actuarial accrued liability as of June 30, 2017 by \$822.6 million or 1.4% and the statutory pension contribution for the fiscal year ending June 30, 2019 by \$52.3 million or 2.2%.

If the ultimate assumption of 7% was used, the actuarial accrued liability as of June 30, 2017 would increase by an additional \$3,074.4 million and the statutory pension contribution for the fiscal year ending June 30, 2019 by an additional \$200.0 million.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments (continued)

Lottery Enterprise Contribution

Chapter 98, P.L. 2017 contributes the State Lottery Enterprise to three statewide retirement systems for a term of 30 years. TPAF will receive 77.78% of future Lottery revenues beginning with fiscal year 2018 and ending with fiscal year 2047. The value of the Lottery Enterprise will be known as the Special Asset Value. The Special Asset Value will be used to determine the funded ratio of the system for comparison purposes to the Target Funded Ratio. The Special Asset Value was determined by an independent appraisal by an external firm. An initial value of \$13,535.0 million as of June 30, 2017 is set in Statute. For purposes of determining the funded ratio, the appraisal value is discounted one year to the valuation date. The addition of the Lottery Enterprise Contribution resulted in an increase in the funded ratio of 16.9% from 46.95% to 63.85% as of July 1, 2016.

As required by Statute, the Special Asset Value is to be appraised at least once every five years. If it is not re-determined more frequently, Statute requires it to be depreciated on a straight line basis during the remaining term of the contribution. The value provided for this valuation by the State is \$13,569.63 million as of June 30, 2018.

The Lottery Enterprise will serve as an offset in determining the statutory contribution. The amount of the offset is equal to the Special Asset Adjustment multiplied by the Adjustment Percentage. The Special Asset Adjustment is based on an amortization of the Special Asset Value over the remaining term of the Lottery Enterprise Contribution. The offset may not be more than the Maximum Special Asset Adjustment in any future year. For TPAF, the Maximum Special Asset Adjustment is equal to \$840,156,036, which is based on a 30-year amortization of the initial value determined for the 2016 actuarial valuation. The Adjustment Percentage is set at 88.27% by Statute for TPAF and may be reduced if the funded ratio falls below 50%. The Adjustment Percentage would be reduced by 3 times the difference between 50% and the funded ratio. It is anticipated that this methodology would result in a lower offset than the expected revenue, thereby increasing the funded ratio of TPAF over the long term.

For the first five fiscal years through June 30, 2022, the Special Asset Adjustment equals an amount specified in Statute. The following table displays the amount along

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments (continued)

with TPAF's allocable portion (77.78%). The allocable portion will reduce the contribution paid by the State for each of these fiscal years.

Special Asset Adjustment for Fiscal Years 2018 – 2022		
Fiscal Year	Amount	TPAF's Allocable Portion
2018	\$1,000,976,874	\$778,559,813
2019	1,037,148,584	806,694,169
2020	1,070,451,102	832,596,867
2021	1,084,354,841	843,411,195
2022	1,095,871,137	852,368,570

Funding Methods

The actuarial funding method for determining the statutory contributions is the Projected Unit Credit method. This method determines the actuarial accrued liability for each member based on service accrued as of the valuation date and projected compensation increases. The normal cost is equal to the present value of the benefit based on projected compensation and service assumed to be earned in the upcoming year. For statutory contribution purposes, the normal cost is divided between the portion based on the 1/60th benefit formula and the additional formula component.

The State portion of the normal cost is reduced by expected member contributions during the upcoming year. Chapter 78, P.L. 2011 increased the employee contribution rate from 5.5% to 6.5% effective October 1, 2011 and by 1/7 of 1% each following July 1 over the next 7 years until 7.5% is attained effective July 1, 2018.

This actuarial valuation is based on the asset valuation method in compliance with Statute. This method recognizes 20% of the difference between the market value of assets and the actuarial value of assets. Per Actuarial Standards of Practice (ASOP) No. 44, a reasonable asset valuation method produces values within a sufficiently narrow range around market value or recognizes differences from market value in a sufficiently short period. As of June 30, 2017, the Actuarial Value of Assets is 108.4% of market value, which is a decrease from the prior year of 114.5%. Investment losses have occurred each year since the July 1, 2000 actuarial valuation on an actuarial value of asset basis. Since the actuarial value of assets exceeds the market value of assets and the asset smoothing method recognizes investment losses slowly over

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments (continued)

time, this will continue to result in upward pressure on the statutory contribution requirements in future years.

The unfunded liability equals the difference in the actuarial accrued liability and the actuarial value of assets. For purposes of determining the statutory contributions, the unfunded liability is amortized over 30 years on a level dollar basis. Since a level dollar method is used, the full amount of interest on the unfunded liability plus a principal portion of the unfunded liability is expected to be paid each year (if the total contribution is paid). The amortization period will remain at 30 years until the June 30, 2019 valuation (2021 fiscal year). At that time, the period will be reduced by 1 each year until 20 years is attained with the June 30, 2028 valuation (2030 fiscal year).

Statutory Contributions

The statutory pension contribution requirements are highlighted on the Summary Exhibits shown on page 3. Included on these exhibits is our understanding of the contributions appropriated or to be appropriated for the 2018 and 2019 fiscal years as well as the actual paid contribution in the 2017 fiscal year. It also reflects the impact of the Lottery Enterprise Contribution beginning with the 2018 fiscal year.

For the 2018 fiscal year, this report was prepared assuming the State has or will appropriate 50% of the gross statutory contribution less the Lottery offset, which is equal to \$721.2 million. In accordance with Chapter 83, P.L. 2016, the first quarter of this amount was deposited on September 27, 2017. For the 2019 fiscal year, the State anticipates funding 60% of the gross statutory contribution less the Lottery offset, which is equal to \$1,118.2 million.

The statutory pension contribution consists of the Normal Contribution, the Additional Formula Contribution and the Accrued Liability Contribution. Chapter 133 P.L. 2001 allows the Additional Formula Contribution to be reduced based on the balance in the Benefit Enhancement Fund (BEF). As of July 1, 2017, there are no assets in the BEF. Furthermore, since there are no Excess Assets as of July 1, 2017, no assets will be transferred to the BEF.

The statutory contribution, reduced by the Lottery offset, increased 8.1% from \$2,221.0 million for the 2018 fiscal year to \$2,401.4 million for the 2019 fiscal year.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments (continued)

Prior to reduction in the investment return assumption, the statutory contribution would have increased 5.7% to \$2,349.1 million. This increase is due to the increase in the Accrued Liability Contribution and the combined normal cost (sum of Normal Contribution and Additional Formula Normal Cost), offset by an increase in the Lottery offset.

The increase in the Accrued Liability Contribution of 7.3% from \$2,637.1 million for the 2018 fiscal year to \$2,828.5 million for the 2019 fiscal year is due to the increase in the unfunded liability discussed in detail below. Excluding the impact of the changes in the actuarial assumptions, the combined normal cost would have decreased from the prior year primarily due the increase in the expected member contributions and lower benefits provided to new hires. The member contribution rate increased from 7.20% as of July 1, 2016 to 7.34% as of July 1, 2017.

In addition to the pension contributions, the State contributes the actual amount of non-contributory group insurance claims. In years prior to the 2014 valuation, the costs for past State ERI programs had been segregated as a receivable contribution and was included in the market value of assets. Beginning with the 2014 valuation, the receivable contribution has been removed from the asset value and the State ERI contributions are now included in the development of the Accrued Liability Contribution. Local ERI programs continue to be held as a receivable with contributions paid by local employers in excess of the statutory contribution requirements. Local ERI contributions are shown on page 4.

Plan Provisions

Between 2007 and 2011, there were several changes to TPAF modifying the retirement conditions, determination of final average compensation, disability benefits, and the benefit accrual rate. This has resulted in many membership tiers. The effect of these tiers will take many years to have a significant impact on the normal cost portions of the contribution. Section VIII outlines the plan provisions of TPAF in detail.

Chapter 78, P.L. 2011 eliminated additional pension adjustment benefits (COLAs) effective July 1, 2011 for all members of TPAF. However, upon attainment of the Target Funded Ratio (TFR), a new pension committee will be formed to review possible changes to member contributions, retirement benefits including eligibility

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments (continued)

conditions, and with priority consideration, reactivation of pension adjustment benefits. The committee may modify the basis for the calculation of the adjustment and set the duration and extent of the reactivation. No decision of the committee will be implemented if the system's funded ratio falls below the TFR in any projected valuation period during the 30 years following implementation.

The Target Funded Ratio (TFR) is defined as the ratio of the sum of the Actuarial Value of Assets and the Special Asset Value to the Actuarially Accrued Liability and equals 75% for fiscal year 2012 (June 30, 2010 actuarial valuation) increasing to 80% in equal increments over the following 7 years. As shown on page 5, the funded ratio as of July 1, 2017 is 60.66%, which is lower than the TFR of 80%. Thus, no changes in benefits can be contemplated for the 2019 fiscal year.

Unfunded Actuarial Accrued Liability

The unfunded Actuarial Accrued Liability (excluding the impact of Special Asset Value) increased by 2,708.9 million from \$30,696.2 million as of July 1, 2016 to \$33,405.1 million as of July 1, 2017. The following table summarizes the reasons for the increase in the unfunded liability.

Unfunded Liability as of June 30, 2016	\$30,696.2
Reduction in Investment Return Assumption to 7.50%	822.6
Scheduled Amortization Payment less/(more) than Interest	(288.9)
Accrual	
State Appropriation plus Expected Lottery Revenue less than Statutorily Required Contribution ¹	1,567.4
Actuarial Loss/(Gain)	652.5
Member Contributions Less/(More) than current level anticipated	<u>(44.7)</u>
Total Change in Unfunded Liability	2,708.9
Unfunded Liability as of June 30, 2017	\$33,405.1

¹ includes adjustment for actual fiscal year 2017 contribution less than assumed in prior valuation

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments (continued)

Funded Ratio

The funded ratio based on the sum of the actuarial value of assets and the Special Asset Value decreased 3.2% from 63.9% as of June 30, 2016 to 60.7% as of June 30, 2017. Due to the asset valuation method, investment losses are expected on an actuarial value basis as the actuarial value of assets was 114.5% of market value as of the beginning of the year.

On a market value basis (excluding the Special Asset Value), the funded ratio decreased 0.1% from 41.0% to 40.9%. The ratio decreased on a market value basis due to 1) the decrease in the investment return assumption and 2) State contributions and expected Lottery Revenue less than the statutory required contribution for the 2018 fiscal year partially offset by 3) investment performance more than expected during the prior year. Since July 1, 2006, the funded ratio on a market value basis has been reduced by 32.0%. This decrease is primarily due to investment losses experienced over the period, State contributions less than the statutory required contribution, and the strengthening of the actuarial assumptions.

As of June 30, 2017, the market value of assets is significantly below the actuarial liability attributable to retirees. The market value of assets includes the Annuity Savings Fund (ASF), which represents accumulated contributions from active and inactive members. If the assets contained in the ASF are excluded, the funded ratio of the remaining market value of assets to the actuarial accrued liability for retirees is 30.5%.

As of June 30, 2017, the ratio of market value of assets to the prior year's benefit payments remained 5.8. This is a simplistic measure of the number of years that the assets can cover benefit payments, excluding: investment income, State and member contributions, future Lottery revenues and future increases in those payments. If ASF assets are excluded, the ratio is 2.8. The ratio for the prior year was 2.9.

Actuarial Gain/(Loss) Analysis

TPAF experienced an actuarial loss of \$652.5 million during the period July 1, 2016 to June 30, 2017 based on the actuarial assumptions adopted in the 2012 Experience Study. This loss is approximately 1.1% of the Actuarial Accrued Liability as of July 1,

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments (continued)

2017. The major factors contributing to this loss are summarized below and are compared to the experience for the prior two plan years.

	<u>June 30, 2017</u>	<u>Gain/(Loss)</u> <i>(Amounts in Millions)</i> <u>June 30, 2016</u>	<u>June 30, 2015</u>
Economic Factors:			
Investment Return	\$(513.5)	\$(859.3)	\$(495.2)
Salary Increases	(27.4)	22.7	50.0
Expenses	(12.4)	(14.3)	(14.3)
Demographic Factors:			
Active Members	(40.8)	(69.2)	(22.8)
New Entrants	(51.3)	(55.5)	(48.1)
Non-Contributing Members	(33.4)	(39.6)	(32.7)
Retirees and Beneficiaries	26.3	23.2	5.0
Year of Mortality Improvement ¹	N/A	(55.3)	(54.1)
Other ²	<u>N/A</u>	<u>N/A</u>	<u>(295.9)</u>
Total	(652.5)	(1,047.3)	(908.1)

¹ For 2015 and 2016, reflects impact on both actives and retirees. For 2017, generational assumption is used and thus, mortality improvement is anticipated in the calculation.

² Includes changes in method to determine gain/loss and valuation system to determine liabilities

Total pension assets earned investment returns of approximately 13.05% on a market value basis and 5.64% on an actuarial value basis for the period ending June 30, 2017. The determination of the approximate rate of return on the market value of assets is based on all assets of the fund including receivables and payables in addition to the investment holdings, but excluding State contribution and Lottery revenue receivables. This will result in a different rate of return than reported by the Division of Investments. The resulting loss of \$513.5 million represents the shortfall in the actuarial value of assets relative to the 7.65% assumed investment return in the prior year.

Salary increases for contributory members who were active on both July 1, 2016 and July 1, 2017 averaged 3.49% versus expected salary increases of 3.37% resulting in an actuarial loss of \$27.4 million. Salaries for new entrants averaged \$55,439, which is significantly below the average salary of all contributory members of \$75,467. This resulted in the average salary of all contributory members increasing by 1.6% over

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

B. General Comments (continued)

last year and combined with the number of active contributing members increasing by 0.3%, total contributory payroll increased by 1.9%.

In addition to demographic behavior different than expected, actuarial losses among active members include the impact of changes in participant data, including changes in service partially due to service purchases. In addition to mortality experience, the actuarial gain among retirees reflects the impact of participant data changes, including changes in benefit amounts and beneficiaries who appear in the valuation for the first time where a prior member record was not provided.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

C. Discussion of Supporting Exhibits

Assets

Section II summarizes the System assets taken into account in the preparation of the actuarial valuation. Subsection A summarizes the market value of System assets as of June 30, 2017 and includes expected contributions from local employers for ERI and Terminal Funding retirements, plus the discounted value of expected contributions from the State during the fiscal year ending June 30, 2018 reflecting quarterly timing, plus the discounted value of expected Lottery revenue during the fiscal year ending June 30, 2018 reflecting deposits throughout the year. State contributions and Lottery revenue are discounted to the valuation date of July 1, 2017.

Subsection B reconciles the development of the market value of pension assets starting from the market values as of June 30, 2016. Subsection C summarizes the development of the actuarial value of pension assets as of July 1, 2017. The exhibit reflects the growth in the pension assets based on the expected investment income at an assumed rate from the prior year of 7.65% adjusted to reflect 20% of the difference between the market value of pension assets as of the valuation date and the expected actuarial value.

Subsection D summarizes the Special Asset Value as of the valuation date of July 1, 2017. It is based on the appraised value provided by the State as of June 30, 2018 discounted one year to the valuation date at the investment return assumption of 7.5% multiplied by the allocable percentage to TPAF. The appraised value reflects 29 years of expected revenues from the fiscal year ending June 30, 2019 until its term of June 30, 2047.

Subsection E estimates the annual rate of return for the year ending June 30, 2017 on the actuarial value and the market value of pension assets. Subsection F summarizes the estimated annual rates of return for the five previous plan years. The 5-year compounded annual return on the actuarial value of assets and the market value of assets are 5.59% and 8.68%, respectively.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

C. Discussion of Supporting Exhibits (continued)

Actuarial Liabilities and Contributions

Section III summarizes the actuarial liabilities and the development of the required State contribution for the plan year beginning July 1, 2017, which reflect the assumptions developed in the 2015 Experience Study and the economic assumptions prescribed by the Treasurer.

Subsection A summarizes the development of the Actuarial Accrued Liability as of July 1, 2017 for all current members and indicates the portion of those present values attributable to active participants, retirees and beneficiaries, and terminated vested participants. Projected benefits based on compensation in excess of the 401(a)(17) compensation cap for a group of grandfathered employees for certain School Districts under Chapter 113, P.L. 1997 have been included in the determination of the Accrued Liability.

Subsection B summarizes the development of the pension Normal Cost under the 1/60 and 1/55 formulas payable July 1, 2017. The schedule shows the portion of the Normal Cost covered by expected member contributions. All member contributions are used as a direct offset in determining the net employer cost. The Normal Cost as of July 1, 2017 was developed based on the Projected Unit Credit Method. Projected benefits based on compensation in excess of the 401(a)(17) compensation cap for a group of grandfathered employees for certain School Districts under Chapter 113, P.L. 1997 have been included in the determination of the Normal Cost.

Subsection C summarizes the Actuarial Accrued Liability and Gross Pension Normal Cost under the 1/55 formula (1/60 formula for Class F and G employees) for active contributory members by employee type as of July 1, 2017.

Subsection D summarizes the development of the Excess Valuation Assets which are \$0 as of July 1, 2017. The Excess Valuation Assets are determined by subtracting the Actuarial Accrued Liability for basic allowances and pension adjustment benefits, the Post-Retirement Medical Premium Fund, the present value of the total projected normal cost in excess of the projected phased-in normal cost for pension adjustment benefits of active members and the BEF (prior to reduction for the additional formula normal contribution for fiscal year 2018) from the Valuation Assets.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

C. Discussion of Supporting Exhibits (continued)

Subsection E summarizes the development of the BEF as of July 1, 2017 and the Additional Formula Normal Contribution. Chapter 133, P.L. 2001 established the BEF as of June 30, 1999. The BEF is \$0 as of June 30, 2017. The BEF is credited with excess assets not to exceed actual member contributions made to the system nor the present value of expected additional normal costs due to the formula change. Since there are no excess assets, there is no contribution to the BEF. Since the BEF is \$0, there is no offset to the additional formula normal cost.

Subsection F summarizes the development of the Lottery Enterprise Contribution offset for the fiscal year ending June 30, 2019. For fiscal years up to June 30, 2022, the offset equals the Special Asset Adjustment specified in Statute multiplied by the allocable percentage to TPAF. Beginning with the 2023 fiscal year, the Lottery offset is expected to be less than expected Lottery revenues.

Subsection G summarizes the development of the State's fiscal year 2019 pension Statutory Required Contributions to TPAF. The total gross pension contribution of \$3,208,116,552 equals the Normal Contribution of \$306,080,234 based on the 1/60 formula plus the Additional Formula Normal Contribution of \$73,581,961 plus the Accrued Liability Contribution of \$2,828,454,357. The State's combined ERI-3 and ERI-5 contributions are \$3,793,009, which is included in the Accrued Liability Contribution. The gross pension contribution is reduced by the Lottery offset of \$806,694,169 for a net statutory contribution of \$2,401,422,383. In addition to these contributions, the State reimburses TPAF for actual noncontributory group insurance claims paid throughout the year.

Subsection H shows the gross pension contribution as a percentage of appropriation payroll on two bases: (1) on a statutory basis – 30.16% and (2) if the Market Value of Assets were used to determine the Accrued Liability Contribution – 31.80%, which is 5.4% higher. Without future investment returns exceeding the assumed rate of return by a significant margin, contributions in future years will continually approach the amount based on market value.

Subsection I summarizes these contributions as a percentage of appropriation pay for the five previous fiscal years. The percentages shown have been adjusted to exclude the portion associated with noncontributory group life insurance claims from 2014 and earlier valuations.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

C. Discussion of Supporting Exhibits (continued)

Subsection J shows the components of Statutory Required Contribution payable by the State and certain State Colleges for the 2019 fiscal year. The Accrued Liability Contribution includes the State ERI contribution allocated to those specific locations. It does not reflect any phase-in of contributions by the State. In addition, a portion of the non-contributory group life insurance claims will also be allocated to each employer. The State's contribution is allocated between the Department of Higher Education, Department of Education, County Colleges, Charter Schools and other based on payroll for active contributory members.

Subsection K shows the calculation of the total actuarial gain (loss). The general comments section outlines the areas where experience differed from that expected.

Subsection L shows the estimated benefit payments over the next 10 fiscal years based on the actuarial assumptions used in this valuation.

Subsection M shows a summary of the assets and liabilities over the past 10 actuarial valuations.

Subsection N shows a summary of the statutory contributions determined over the past 10 actuarial valuations and the actual contributions made by fiscal year. The State has implemented a 10-year phase-in policy to increase contributions to the full statutory contribution requirement beginning with year 3 in fiscal year 2016. Each year thereafter, the ratio of the State contribution paid plus Lottery revenue to the statutory contribution has increased by approximately 10%.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

C. Discussion of Supporting Exhibits (continued)

Actuarial Balance Sheet

Section IV provides the actuarial balance sheet summarizing the assets and liabilities by Fund as of June 30, 2017. The assets credited to the various funds include the portion of the investment income allocated to each fund for the year ending June 30, 2017. The actuarial value of assets is used as the basis for the balance sheet. Note that the actuarial value of assets is 8% higher than market value. The liabilities presented are based on the actuarial accrued liabilities summarized in Section III.

The actuarial balance sheet indicates the following transfers should be made:

(1) Retirement Reserve Fund

When a member retires, or when he dies and an allowance is payable to his beneficiary, the allowance including cost-of-living adjustments, if any, is paid from the Retirement Reserve Fund. The member's own contributions with interest are transferred from the Annuity Savings Fund, and the balance of the reserve on the total allowance is transferred from the Contingent Reserve Fund. As of June 30, 2017, the Retirement Reserve Fund has present assets of \$38,452,910,560 including accrued interest. The liabilities of the fund amount to \$39,194,557,919 so that there is a deficit of \$741,647,359 in the fund as of the valuation date. New Jersey statute states that the fund be put in balance as of June 30, 2017 by a transfer of assets from the Contingent Reserve Fund, and this transfer is shown in the balance sheet. Note that the balance in the Contingent Reserve Fund is negative so that the Retirement Reserve fund remains in balance.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

C. Discussion of Supporting Exhibits (continued)

(2) Annuity Savings Fund and Contingent Reserve Fund

The Annuity Savings Fund, which is the fund to which members' contributions with interest are credited, has assets amounting to \$12,531,120,389 as of June 30, 2017 after accrued interest has been added. The Contingent Reserve Fund is the fund to which contributions made by the State and local employers to provide the benefits paid from retirement fund monies are credited. The assets creditable on an actuarial value basis to the Contingent Reserve Fund amount to \$(25,176,268,093) as of June 30, 2017 after adjustment is made on account of accrued interest and the amounts transferable to the Retirement Reserve Fund and from the Pension Fund. If a market value basis was used, assets creditable to the Contingent Reserve Fund after transfers would amount to \$(27,230,375,125).

If a member withdraws from active service before qualifying for retirement, the amount of his accumulated deductions is paid to him from the Annuity Savings Fund. If he dies before retirement and no survivorship benefit is payable, his accumulated deductions are paid to his beneficiary from the Annuity Savings Fund. If he retires, or if he dies leaving a beneficiary eligible for a survivorship benefit, his accumulated deductions are transferred from the Annuity Savings Fund to the Retirement Reserve Fund, and the reserve on the allowance which is not provided by his own deductions is transferred from the Contingent Reserve Fund to the Retirement Reserve Fund. Any lump sum benefit payable upon the death of a member before or after retirement is paid by The Prudential Insurance Company of America.

(3) Benefit Enhancement Fund

The reserves held in the BEF are used to fund the additional formula normal contributions. The BEF is credited with excess assets not to exceed actual member contributions made to the system nor the present value of the expected additional formula normal contributions. No additional excess assets will be credited to the BEF after the maximum amount is attained. If excess assets permit, monies are transferred from the Contingent Reserve Fund. As of June 30, 2017, the BEF has no assets.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION I - SUMMARY (continued)

C. Discussion of Supporting Exhibits (continued)

(4) Special Reserve Fund

The Special Reserve Fund is the fund to which any excess interest earnings are transferred and against which any losses from the sale of securities are charged. The maximum limit on the accumulations in this fund is set at one percent of the market value of the investments of the retirement fund; any amounts in excess of this limit are creditable to the Contingent Reserve Fund. The Special Reserve Fund is considered as an asset of the retirement fund. This fund has assets amounting to \$0 as of June 30, 2017.

Census Data

Section V summarizes the census data provided by the Division of Pensions and Benefits and utilized in the preparation of the actuarial valuation. Subsection A provides a reconciliation of the current year participant counts from the prior valuation. Subsection B shows the appropriation count and salary information by group. Subsection C shows the number and annual retirement allowances with pension adjustments by beneficiary type. Subsection D shows information on members who retired since the last valuation split between those who retired with less than and more than 25 years of service. Subsection E provides additional retiree information. Subsections F and G present a profile of Contributory and Non-contributory members split by gender, summarized by 5-year age and service groupings. Subsection H provides a profile of terminated vested members, retired members, disabled members, and beneficiaries broken down into 5-year age categories. The census data represents the status of plan participants as of June 30, 2017.

In performing this analysis, we relied, without audit, on census data, plan provisions, asset statements and other information (both written and oral) provided by the State of New Jersey Division of Pensions and Benefits. We have not audited or verified the census data, asset statements or other information. To the extent any of these are inaccurate or incomplete, the results of our analysis may likewise be inaccurate or incomplete.

We performed a limited review of the data used directly in our analysis for reasonableness and consistency and have not found material defects in the data. If there are material defects in the data, it is possible that they would be uncovered by

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SECTION I - SUMMARY (continued)

C. Discussion of Supporting Exhibits (continued)

a detailed, systematic review and comparison of the data to search for data values that are questionable or for relationships that are materially inconsistent. Such a review was beyond the scope of our assignment.

Actuarial Assumptions and Methods

Section VI summarizes the actuarial assumptions and methods utilized in the preparation of this actuarial valuation. Subsection A identifies the various assumptions. These assumptions are based on the assumptions developed in the Experience Study from July 1, 2012 to June 30, 2015 and the economic assumptions prescribed by the Treasurer. Subsection B summarizes the actuarial valuation methodology set forth in Chapter 62, P.L. 1994 as modified by Chapters 115, P.L. 1997, 133, P.L. 2001 and 92 P.L. 2007.

Future actuarial measurements may differ significantly from the current measurements presented in this analysis due to actual plan experience deviating from the actuarial assumptions, and changes in plan provisions, actuarial assumptions, and applicable law. An assessment of the potential range and cost effect of such differences is beyond the scope of this analysis.

Summary of Principal Plan Provisions

Section VII summarizes the principal plan provisions as of the valuation date and denotes any changes from the previous valuation.

Early Retirement Incentive Contribution Schedule

Appendix I displays the contribution schedule for the early retirement incentive programs (ERI-1, ERI-2, ERI-3, ERI-4 and ERI-5) by location for the 2019 fiscal year. It also provides the present value of the future contributions as of June 30, 2017. This list reflects locations which paid off their ERI liabilities through June 2017 as a result of Chapter 42, P.L. 2002.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION II - ASSETS

A. Market Value of Pension Assets as of June 30, 2017

1. Assets		
Cash	\$	353,178,098
Investment Holdings		22,749,001,533
Employers' Contributions Receivable - NCGI		4,081,785
Employers' Contributions Receivable - State		0
Employers' Contributions Receivable - Local		17,018,568
Employers' Contributions Receivable - Delayed Enrollments		449,044
Employers' Contributions Receivable - Delayed Appropriations		5,020,026
Members' Contributions Receivable		76,505,113
Accrued Interest on Investments		41,228
Accounts Receivable		12,647,936
Loans Receivable		<u>283,207,356</u>
Total	\$	<u>23,501,150,687</u>
2. Liabilities		
Pension Payroll Payable	\$	284,081,089
Pension Adjustment Payroll Payable		27,162,884
Withholdings Payable		43,821,186
Death Benefits Payable		4,029,942
Net Securities Lending Collateral		(87,239)
Accounts Payable - Other		<u>85,980,996</u>
Total	\$	<u>444,988,858</u>
3. Market Value of Pension Assets as of June 30, 2017: (1) - (2)	\$	23,056,161,829
4. FY 2018 Discounted Receivable Contributions from Lottery Proceeds *		750,386,420
5. FY 2018 Discounted Receivable Contributions from State **		<u>688,754,934</u>
6. Adjusted Market Value of Pension Assets as of June 30, 2017: (3) + (4) + (5)	\$	<u>24,495,303,183</u>

* Receivable contribution of \$778,559,813 discounted with one-half year of interest at 7.65%

** Receivable contribution of \$721,229,521 discounted based on quarterly payments at 7.65% interest

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION II - ASSETS

(continued)

B. Reconciliation of Market Value of Pension Assets from June 30, 2016 to June 30, 2017

	<u>Pension</u>
1. Market Value of Pension Assets as of June 30, 2016 (excluding receivable)	\$ 22,717,862,967
2. Increases	
Member Contributions excluding transfers from Other Systems	\$ 781,256,291
Member Transfer Contributions	7,332,005
Other Employer Contributions including Transfers From Other Systems, Delayed Appropriations and Delayed Enrollments	3,895,827
State and Local Appropriations	1,127,018,480
Investment Income	<u>2,736,988,791</u>
Total	\$ <u>4,656,491,394</u>
3. Decreases	
Withdrawal of Member Contributions and Transfer Contributions	\$ 68,191,977
Retirement Allowances	3,881,732,051
Pension Adjustment Benefits	317,245,237
Death Benefit Claims	39,099,480
Administrative Expense	<u>11,923,787</u>
Total	\$ <u>4,318,192,532</u>
4. Market Value of Pension Assets as of June 30, 2017: (1) + (2) - (3)	\$ 23,056,161,829
5. FY2018 Discounted Receivable Contributions from Lottery Proceeds *	750,386,420
6. FY2018 Discounted Receivable Contributions from State**	<u>688,754,934</u>
7. Adjusted Market Value of Pension Assets as of June 30, 2017: (4) + (5) + (6)	\$ <u>24,495,303,183</u>

* Receivable contribution of \$778,559,813 discounted with one-half year of interest at 7.65%

** Receivable contribution of \$721,229,521 discounted based on quarterly payments at 7.65% interest

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION II - ASSETS

(continued)

C. Development of Actuarial Value of Assets as of July 1, 2017

1. Actuarial Value of Pension Assets as of July 1, 2016	\$ 27,169,758,348
2. Net Cash Flow without Investment Income	(3,493,051,061)
3. Investment Income at Actuarially Assumed Rate @ 7.65%	1,947,088,332
4. Discounted Receivable Contributions from State and Lottery Proceeds	<u>1,439,141,354</u>
5. Expected Actuarial Value of Pension Assets: (1) + (2) + (3) + (4)	27,062,936,973
6. Adjusted Market Value of Pension Assets as of June 30, 2017	24,495,303,183
7. Excess Market Value over Expected Actuarial Value Assets: (6) - (5)	(2,567,633,790)
8. 20% mark-up to reflect growth in Market Value: 20% x (7)	<u>(513,526,758)</u>
9. Actuarial Value of Pension Assets as of July 1, 2017: (5) + (8)	\$ <u><u>26,549,410,215</u></u>
10. Pension Actuarial/Market Value Ratio: (9) / (6)	108.4%

D. Development of Special Asset Value as of July 1, 2017

1. Lottery Enterprise Value as of Appraisal Date of June 30, 2018 *	\$ 13,569,630,580
2. Depreciated Value as of end of Valuation Year at June 30, 2018	13,569,630,580
3. Discounted Value as of Valuation Date of July 1, 2017	12,622,912,167
4. Allocable Percentage to TPAF	77.78%
5. Special Asset Value as of July 1, 2017	9,818,101,083

* Provided by State

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION II - ASSETS

(continued)

E. Estimated Annual Rate of Return for year ending June 30, 2017

	<u>Pension Actuarial Value</u>	<u>Pension Market Value</u>
1. Value of Assets as of July 1, 2016	\$ 27,169,758,348	\$ 22,717,862,967
2. Employee Contributions	792,484,123	792,484,123
3. State and Local Appropriations (adjusted for prior year receivable contribution differences on AVA)	32,657,348	1,127,018,480
4. Receivable Contributions (State and Lottery Proceeds)	1,439,141,354	1,439,141,354
5. Benefit Payments and Expenses	4,318,192,532	4,318,192,532
6. Value of Assets as of June 30, 2017	26,549,410,215	24,495,303,183
7. Non-Investment Increment: (2) + (3) - (5)	(3,493,051,061)	(2,398,689,929)
8. Investment Increment: (6) - (1) - (4) - (7)	1,433,561,574	2,736,988,791
9. Time Weighted Value: (1) +.5 x (7)	25,420,011,751	20,974,558,503
10. Estimated Annual Rate of Return: (8) / (9)	5.64%	13.05%

F. Estimated Historical Rates of Return

<u>Plan Year Ending</u>	<u>Actuarial Value</u>	<u>Market Value</u>
June 30, 2017	5.64%	13.05%
June 30, 2016	4.68%	-1.12%
June 30, 2015	6.10%	4.15%
June 30, 2014	6.67%	16.58%
June 30, 2013	4.86%	11.69%
5-Year Compounded Annual Rate of Return	5.59%	8.68%

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTIONS

A. Actuarial Accrued Liability as of July 1, 2017- 1/55th Formula

1. Projected Benefits Payable to Beneficiaries and Retirees	
Service Retirees (Including ERI Benefits)	\$ 37,032,905,665
Disability Retirees	890,148,755
Beneficiaries	<u>1,271,503,499</u>
Total	\$ 39,194,557,919
2. Projected Benefits for Vested Terminated Members	30,412,593
3. Projected Benefits for Non-Contributory Members	\$ 832,286,244
4. Projected Benefits for Active Members	
Service Retirement	\$ 18,672,440,217
Ordinary Disability Retirement	510,663,684
Accidental Disability Retirement	23,576,793
Return of Members' Contributions - Death	133,986,254
Return of Members' Contributions - Withdrawal	183,156,890
Deferred Retirement	373,468,106
Pension Adjustment Benefits	<u>0</u>
Total	\$ 19,897,291,944
5. Total Pension Accrued Liability: (1) + (2) + (3) + (4)	\$ 59,954,548,700

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTIONS

(continued)

B. Development of Normal Cost payable July 1, 2017

	<u>1/60th Formula</u>	<u>1/55th Formula</u>
1. Basic Allowances	\$ 1,036,127,978	\$ 1,104,576,314
2. Expected Member Contributions (adjusted to valuation date)	<u>751,402,179</u>	<u>751,402,179</u>
3. Net Pension Normal Cost: (1) - (2)	284,725,799	353,174,135

C. Summary of Active Member Actuarial Accrued Liability & Normal Cost payable July 1, 2017

<u>Employee Type</u>	<u>Number of Members</u>	<u>Total Appropriation Salary</u>	<u>Actuarial Accrued Liability</u>	<u>Gross Pension Normal Cost (1/55th Formula) *</u>
Class A & B	85,615	\$7,322,957,003	\$18,346,141,286	\$844,798,092
Class D	10,688	698,999,887	647,559,359	64,215,258
Class E	5,340	337,222,479	251,453,009	29,760,740
Class F	3,124	194,047,326	109,286,511	15,097,451
Class G	<u>36,221</u>	<u>2,082,791,174</u>	<u>542,851,779</u>	<u>150,704,773</u>
Total	140,988	\$10,636,017,869	\$19,897,291,944	\$1,104,576,314

* 1/60th formula for Class F and G employees

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTIONS

(continued)

D. Development of Excess Valuation Assets as of July 1, 2017

1. Valuation Assets	\$ 26,549,410,215
2. Actuarial Accrued Liability for Basic Allowances & Pension Adjustment Benefits	59,954,548,700
3. Present Value of Total Projected Normal Cost in Excess of the Projected Phased-in Normal Cost for Pension Adjustment Benefits	0
4. Benefit Enhancement Fund (prior to reduction for additional formula normal cost)	<u>0</u>
5. Excess Valuation Assets as of July 1, 2017: (1)-(2)-(3)-(4)-(5), not less than \$0	\$ 0

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTIONS

(continued)

**E. Development of Benefit Enhancement Fund and Additional Formula Contribution
As of July 1, 2017**

1. Benefit Enhancement Fund as of July 1, 2016	\$	0
2. Accrued Interest		<u>0</u>
3. Benefit Enhancement Fund as of July 1, 2017		0
4. Additional Formula Normal Cost to be paid by Benefit Enhancement Fund		
a. Gross Normal Cost payable July 1, 2017 - 1/55th Formula (B)(3)(a)		1,104,576,314
b. Gross Normal Cost payable July 1, 2017 - 1/60th Formula (B)(3)(b)		<u>1,036,127,978</u>
c. Additional Formula Normal Cost: (a) - (b)		68,448,336
5. Net Benefit Enhancement Fund Balance as of July 1, 2017 before Fiscal Year 2019 Contribution: (3) - (4c), not less than \$0		0
6. State Additional Formula Contribution as of July 1, 2017: (4c) - (3), not less than \$0		68,448,336
7. Estimated Fiscal Year 2019 Employee Contributions as of July 1, 2017		737,427,365
8. Limit on Fiscal Year 2019 Contribution to Benefit Enhancement Fund		
a. Present Value of Future Normal Costs as of June 30, 2017 - 1/55th Formu		10,900,528,051
b. Present Value of Future Normal Costs as of June 30, 2017 - 1/60th Formu		<u>10,172,679,849</u>
c. Limit: (a) - (b) - (5)		727,848,202
9. Excess Assets Available (D6)		0
10. Fiscal Year 2019 Allowable Contribution to Benefit Enhancement Fund: Lesser of (7), (8c), (9)	\$	0

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTIONS

(continued)

F. Development of Lottery Enterprise Contribution Offset Fiscal Year 2019

For Fiscal Years Beginning 2023

1. Special Asset Value Allocated to TPAF as of July 1, 2017 (II-D5)	\$ 9,818,101,083
2. 29 - Year Level Dollar Amortization payable June 30, 2018	839,429,068
3. Initial Special Asset Value allocated to TPAF as of July 1, 2016	9,779,398,978
4. Maximum Special Asset Adjustment (30-year amortization, 7.65% interest)	840,156,036
5. Special Asset Adjustment as of June 30, 2018: Lesser of (2) and (4)	839,429,068
6. Adjustment Percentage	88.27%
7. Funded Ratio based on Actuarial Value and Special Asset Value	60.66%
8. Applicable Adjustment Percentage: If (7) < 50%, (6) - 3 * (50% - (7))	88.27%

For Fiscal Years Through 2022

9. Special Asset Adjustment for Fiscal Year 2019	1,037,148,584
10. Allocable Percentage to TPAF	77.78%
11. Adjustment Percentage	100.00%
12. Lottery Enterprise Contribution Offset as of June 30, 2018: Based on applicable fiscal year: (5) * (8) or (9) * (10) * (11)	806,694,169

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTIONS

(continued)

G. Development of State's Fiscal Year 2019 Statutory Required Contributions

1. Net Pension Normal Contribution as of July 1, 2017: B(3)	\$ 284,725,799
2. Net Pension Normal Contribution as of June 30, 2018	306,080,234
3. Additional Formula Contribution as of July 1, 2017: E(6)	68,448,336
4. Additional Formula Contribution as of June 30, 2018	73,581,961
5. Accrued Liability Contribution	
a. Actuarial Accrued Liability for Basic Allowances & Pension Adjustment Benefits	\$ 59,954,548,700
b. Adjusted Actuarial Value of Assets (excluding BEF)	<u>26,549,410,215</u>
c. Unfunded Pension Accrued Liability: (a) - (b)	\$ 33,405,138,485
d. 30 - Year Level Dollar Amortization with payments of Unfunded Pension Accrued Liability payable June 30, 2018	2,828,454,357
6. Gross Pension Contribution for State's Fiscal Year 2019: (2) + (4) + (5d)	\$ 3,208,116,552
7. Lottery Enterprise Contribution Offset State's Fiscal Year 2019: F(12)	<u>(806,694,169)</u>
8. Net Pension Contribution for State's Fiscal Year 2019: (6) + (7) *	2,401,422,383

* State ERI contributions are included in Accrued Liability Contribution. In addition, State will also reimburse the actual amount of noncontributory group insurance claims paid from TPAF.

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTIONS

(continued)

**H. Statutory Required Contribution as a Percentage of Appropriation Payroll
(excluding Lottery offset)**

	<u>Percent of Payroll</u>
Basic Allowances Net of Member Contributions - 1/60th Formula	2.88%
Additional Formula Normal Cost (after any BEF reductions)	0.69%
Accrued Liability Contribution	<u>26.59%</u>
Gross Pension Contribution for State's Fiscal Year 2019	30.16%
Increases in contribution if:	
No BEF reductions existed	0.00%
Market Value of Assets used to determine the Accrued Liability Contribution	<u>1.64%</u>
Total Increases as a percent of payroll	1.64%
Total Contribution with these increases as a percent of payroll	31.80%

I. Historical Statutory Required Contributions as a Percentage of Appropriation Payroll *

Fiscal Year <u>Ending</u>	Statutory <u>Pension</u>	With Increases Above <u>Included</u>
June 30, 2019	30.16%	31.80%
June 30, 2018	28.74%	31.57%
June 30, 2017	26.55%	28.24%
June 30, 2016	25.04%	26.25%
June 30, 2015	22.98%	26.14%

* Historical percentages have been modified to remove noncontributory group insurance claims since the actual amounts are reimbursed by the State

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTIONS

(continued)

J. Fiscal Year 2019 Full Statutory Required Contributions Payable by the State and Certain State Colleges *

<u>Group</u>	<u>Normal Contribution (1/60 Formula)</u>	<u>Additional Formula Contribution (After BEF reductions)</u>	<u>Accrued Liability Contribution **</u>	<u>Lottery Contribution Offset</u>	<u>Total</u>
<u>Certain State Colleges</u>					
NJ Institute of Technology	\$0	\$0	\$76,147	\$0	\$76,147
Rowan University	0	0	64,228	0	64,228
New Jersey University	3,564	857	411,548	(9,394)	406,575
Kean University	6,497	1,562	258,015	(17,123)	248,951
William Patterson University	10,793	2,595	172,733	(28,445)	157,676
Montclair State U. (Group 4)	0	0	156,685	0	156,685
The College of NJ	0	0	40,272	0	40,272
Stockton State College	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total for Certain State Colleges	\$20,854	\$5,014	\$1,179,628	(\$54,962)	\$1,150,534
<u>State</u>					
Dept of Higher Education	0	0	0	0	0
Dept of Education	311,985	75,001	5,684,987	(822,256)	5,249,717
County Colleges	21,662	5,208	199,911	(57,093)	169,688
Charter Schools	6,874,953	1,652,745	63,445,505	(18,119,382)	53,853,821
Other	<u>298,850,780</u>	<u>71,843,993</u>	<u>2,757,944,326</u>	<u>(787,640,476)</u>	<u>2,340,998,623</u>
Total for State	<u>\$306,059,380</u>	<u>\$73,576,947</u>	<u>\$2,827,274,729</u>	<u>(\$806,639,207)</u>	<u>\$2,400,271,849</u>
Total for System	<u>\$306,080,234</u>	<u>\$73,581,961</u>	<u>\$2,828,454,357</u>	<u>(\$806,694,169)</u>	<u>\$2,401,422,383</u>

* In addition, a portion of the non-contributory group life insurance claims will also be allocated to each employer.

** Includes State ERI contributions

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTION

(continued)

K. Analysis of Actual Experience for the Year Ended June 30, 2017

1. Unfunded Accrued Liability as of July 1, 2016	\$	30,696,212,815
2. Gross Normal Cost as of July 1, 2016		1,058,999,236
3. Interest: ((1) + (2)) * 7.65%		2,429,273,722
4. Employee, Employer and Lottery Contributions Made with Interest		<u>2,254,444,481</u>
5. Expected Unfunded Accrued Liability as of June 30, 2017: (1) + (2) + (3) - (4)	\$	31,930,041,292
6. Increase/(Decrease) in liability due to assumption changes		822,620,195
7. Increase/(Decrease) in liability due to statutory changes		0
8. Expected Unfunded Accrued Liability after changes as of June 30, 2017: (5) + (6) + (7)	\$	32,752,661,487
9. Actual Unfunded Accrued Liability as of June 30, 2017		<u>33,405,138,485</u>
10. Gain/(Loss): (8) - (9)	\$	<u>(652,476,998)</u>

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTION

(continued)

L. Estimated Benefit Payments for next 10 Fiscal Years - Pension Only

<u>Fiscal Year Ending</u>	<u>Estimated Benefit Payments</u>
June 30, 2018	\$ 4,343,547,000
June 30, 2019	4,461,128,000
June 30, 2020	4,565,758,000
June 30, 2021	4,661,632,000
June 30, 2022	4,749,013,000
June 30, 2023	4,831,023,000
June 30, 2024	4,913,286,000
June 30, 2025	4,997,454,000
June 30, 2026	5,086,581,000
June 30, 2027	5,181,730,000

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION III - LIABILITIES AND CONTRIBUTION

(continued)

M. Historical Summary of Assets and Liabilities (\$ amounts in thousands)

Valuation Date	Market Value of Assets	Actuarial Value of Assets + Special Asset Value ¹	Actuarial Accrued Liability	Funded Ratio	
				Market Value	Actuarial + Special Asset Value ¹
2017	\$ 24,495,303	\$ 36,367,511	\$ 59,954,549	40.86%	60.66%
2016	23,732,571	36,949,157	57,865,971	41.01%	63.85%
2015	26,320,739	28,301,404	55,359,377	47.55%	51.12%
2014	27,643,078	29,044,778	53,749,977	51.43%	54.04%
2013	26,859,612	30,469,857	52,366,655	51.29%	58.19%
2012	26,037,983	31,079,213	51,194,111	50.86%	60.71%
2011	27,654,007	32,156,229	50,222,689	55.06%	64.03%
2010	25,763,645	33,136,476	48,417,932	53.21%	68.44%
2009	24,973,887	34,708,001	53,418,329	46.75%	64.97%
2008	32,358,228	36,541,084	50,658,278	63.88%	72.13%

¹ Special Asset Value reflected beginning with 2016 valuation year

N. Historical Summary of State Appropriation for Pension (\$ amounts in thousands)

Fiscal Year Ending June 30	Gross Statutory Contribution	Actual State Appropriation	Actual Lottery Revenue	Contribution Deficiency (Excess)	Percentage of Contribution Covered
2018 *	\$ 2,999,578	\$ 721,230	\$ 778,560	\$ 1,499,788	50.00%
2017	2,737,175	1,087,919	0	1,649,256	39.75%
2016	2,544,812	764,489	0	1,780,323	30.04%
2015	2,306,612	504,320	0	1,802,292	21.86%
2014	2,158,287	392,036	0	1,766,251	18.16%
2013	2,148,185	613,767	0	1,534,418	28.57%
2012	2,009,810	287,116	0	1,722,694	14.29%
2011	1,826,722	0	0	1,826,722	0.00%
2010	1,526,169	0	0	1,526,169	0.00%
2009	1,348,106	64,376	0	1,283,730	4.78%
2008	1,286,147	663,792	0	622,355	51.61%

* Reflects budgeted State contribution of \$721,229,521 and expected lottery revenue of \$778,559,813 to be paid during fiscal year ending June 30, 2018

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION IV - ACTUARIAL BALANCE SHEET AS OF JUNE 30, 2017

<u>Assets</u>		<u>Liabilities</u>	
<u>Retirement Reserve Fund (RRF)</u>		<u>Payable from Retirement Reserve Fund</u>	
Credited to Fund w/ Distribution of Income	\$38,452,910,560	Retirees, Disableds and Beneficiaries	
Add/(deduct) reserve transferable from/(to) CRF	<u>741,647,359</u>	currently receiving benefits	\$39,194,557,919
Adjusted Total	39,194,557,919		
 <u>Pension Fund (PF)</u>		 <u>Payable from Pension Fund</u>	
Credited to Fund w/ Distribution of Income	0	Retirees, Disableds and Beneficiaries	
Add/(deduct) reserve transferable from/(to) CRF	<u>0</u>	currently receiving benefits	0
Adjusted Total	0		
Annuitiy Savings Fund (ASF) w/ Distribution of Income	12,531,120,389	 <u>Payable from Annuity Savings Fund</u>	
		<u>and Contingent Reserve Fund</u>	
 <u>Contingent Reserve Fund (CRF)</u>		Active Members	20,729,578,188
Credited to Fund w/ Distribution of Income	(24,434,620,734)	Term Vested Members	<u>30,412,593</u>
Add/(Deduct) from/(to) RRF, PF & SRF	<u>(741,647,359)</u>	Total	20,759,990,781
Adjusted Total	(25,176,268,093)		
 <u>Benefit Enhancement Fund (BEF)</u>	0		
 <u>Special Reserve Fund (SRF)</u>	0		
Add/(deduct) reserve transferable from/(to) CRF	<u>0</u>		
Adjusted Total	0		
Total Actuarial Value of Assets as of June 30, 2017	\$26,549,410,215		
Special Asset Value as of June 30, 2017	9,818,101,083		
Present Value of Prospective Contributions to the CRF			
and BEF for service accrued as of July 1, 2017	<u>23,587,037,402</u>		
Total Assets	\$59,954,548,700	Total Liabilities	\$59,954,548,700

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION V - CENSUS DATA

A. Reconciliation with Prior Year

	<u>Active Contrib</u>	<u>Active NonContrib</u>	<u>Deferred Vested</u>	<u>Retirees</u>	<u>Disableds</u>	<u>Beneficiaries</u>	<u>Domestic Relation Beneficiaries</u>	<u>Total</u>
Members as of June 30, 2016	140,563	13,600	222	90,822	3,430	6,095	899	255,631
Terminated Vested	(13)	(50)	63	-	-	-	-	0
Terminated with Refund	(681)	(2,094)	(1)	-	-	-	-	(2,776)
Retired	(3,672)	(199)	(78)	3,949	-	-	-	0
Disabled	(149)	(77)	-	(8)	234	-	-	0
Died with Beneficiary	-	-	-	(415)	(30)	445	-	0
Died without Beneficiary	(63)	(34)	-	(1,649)	(82)	(295)	-	(2,123)
Payments Began	-	-	-	-	-	-	77	77
Payments Ceased	-	-	-	-	-	(3)	(28)	(31)
New Actives and Rehires	7,462	150	-	-	-	-	-	7,612
Changed to Contributing	1,955	(1,955)	-	-	-	-	-	0
Changed to Noncontributing	(4,374)	4,374	-	-	-	-	-	0
Data Corrections	<u>(40)</u>	<u>155</u>	<u>0</u>	<u>12</u>	<u>1</u>	<u>74</u>	<u>0</u>	<u>202</u>
Members as of June 30, 2017	<u>140,988</u>	<u>13,870</u>	<u>206</u>	<u>92,711</u>	<u>3,553</u>	<u>6,316</u>	<u>948</u>	<u>258,592</u>

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION V - CENSUS DATA

(continued)

B. Appropriation Number and Salary by Group *

<u>Group</u>	<u>Number of Employers</u>	<u>Number of Members</u>	<u>Appropriation Salary</u>
Department of Higher Education	0	0	\$ 0
Department of Education	3	114	10,841,201
New Jersey Institute of Technology	0	0	0
State Colleges	3	6	724,664
County Colleges	5	6	752,748
Charter Schools	88	3,983	238,898,557
Other	<u>590</u>	<u>136,879</u>	<u>10,384,800,699</u>
Total	<u>689</u>	<u>140,988</u>	\$ <u>10,636,017,869</u>

* Excludes salary in excess of Taxable Wage Base for members hired after June 30, 2007

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION V - CENSUS DATA

(continued)

C. Number and Annual Benefits Including Pension Adjustments of Retirees, Beneficiaries, and Dependents on Roll

<u>Group</u>	<u>Number</u>	<u>Annual Benefit</u>
Service and Early Retirements (incl Domestic Relation Beneficiaries)	93,659	\$ 3,914,034,990
Ordinary Disability Retirements	3,289	92,207,746
Accidental Disability Retirements	264	11,796,882
Ordinary Death Benefits	1	394
Accidental Death Benefits	2	85,075
Dependents of Deceased Beneficiaries	6,260	165,132,914
Dependents of Deceased Beneficiaries who elected to receive annuities certain instead of lump sum	<u>53</u>	<u>1,404,174</u>
Total	<u>103,528</u>	\$ <u>4,184,662,175</u>

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION V - CENSUS DATA

(continued)

D. New* Retirees from Active Contributory Status

	<u>Less than 25 years of service</u>	<u>At least 25 years of service</u>	<u>Total</u>
Number of Retirements	832	2,807	3,639
Total Annual Pension	\$21,099,053	\$147,683,705	\$168,782,758
Average Annual Pension	\$25,359	\$52,613	\$46,382
Average Age at Retirement	64.8	61.7	62.4
Average Service at Retirement	17.0	31.2	28.0

* Members indicated as retired since last actuarial valuation and have not subsequently died prior to the valuation date.

E. Average Age and Average Annual Pension at Retirement

	<u>Average Age at Retirement</u>	<u>Average Annual Pension at Retirement</u>	<u>Count</u>
New Retirees from Active Contributory Status			
Service Retirement	64.5	\$44,764	2,649
Early Retirement	56.6	50,711	990
Ordinary Disability	57.4	33,623	145
Accidental Disability	55.0	62,884	4
Survivors **	60.6	40,592	17
All Retirees			
Service Retirement	63.1	\$37,649	55,930
Early Retirement	56.3	41,737	36,781
Ordinary Disability	54.4	25,959	3,289
Accidental Disability	52.9	40,265	264
Survivors	55.8	21,737	6,316

** Members indicated as retired since last actuarial valuation and have subsequently died prior to the valuation date.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION V - CENSUS DATA

(continued)

F. Age, Service and Salary Profile of Active Contributing Participants

Age Group	Males									Total	Average Annual Salary
	Years of Service										
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+		
15-19	0	0	0	0	0	0	0	0	0	0	\$0
20-24	191	1	0	0	0	0	0	0	0	192	52,648
25-29	2,185	423	2	0	0	0	0	0	0	2,610	54,789
30-34	1,426	2,306	652	0	0	0	0	0	0	4,384	60,675
35-39	673	1,113	2,900	717	1	0	0	0	0	5,404	72,354
40-44	387	538	1,389	2,661	287	0	0	0	0	5,262	83,808
45-49	297	351	763	1,689	1,572	211	1	0	0	4,884	90,909
50-54	187	224	505	781	887	788	148	0	0	3,520	93,182
55-59	156	187	409	579	476	380	507	113	0	2,807	93,338
60-64	80	120	302	444	351	239	225	306	84	2,151	94,840
65 & Up	50	66	204	266	191	119	68	74	227	1,265	99,605
Total	5,632	5,329	7,126	7,137	3,765	1,737	949	493	311	32,479	
	Average Age			=	44.0						
	Average Service			=	14.0						
	Average Annual Salary			=	\$80,360						

Age Group	Females									Total	Average Annual Salary
	Years of Service										
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+		
15-19	2	0	0	0	0	0	0	0	0	2	\$53,692
20-24	1,181	0	0	0	0	0	0	0	0	1,181	52,304
25-29	9,329	1,912	5	0	0	0	0	0	0	11,246	54,953
30-34	4,788	7,999	2,066	2	0	0	0	0	0	14,855	59,845
35-39	2,190	3,401	9,198	1,811	3	0	0	0	0	16,603	68,662
40-44	1,747	1,699	3,944	7,109	650	1	0	0	1	15,151	76,563
45-49	1,522	1,633	2,543	4,407	3,900	558	0	0	0	14,563	81,027
50-54	913	1,266	2,206	2,490	1,823	2,360	570	1	0	11,629	81,950
55-59	453	736	1,967	2,719	1,635	1,393	1,748	259	2	10,912	84,586
60-64	204	347	1,128	2,253	1,887	1,247	709	718	139	8,632	87,465
65 & Up	49	97	370	764	792	708	402	220	333	3,735	92,637
Total	22,378	19,090	23,427	21,555	10,690	6,267	3,429	1,198	475	108,509	
	Average Age			=	43.8						
	Average Service			=	13.2						
	Average Annual Salary			=	\$73,911						

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION V - CENSUS DATA

(continued)

G. Age, Service and Salary Profile of Active Non-Contributing Participants *

Age Group	Males									Total	Average Annual Salary
	Years of Service										
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+		
15-19	0	0	0	0	0	0	0	0	0	0	\$0
20-24	1	0	0	0	0	0	0	0	0	1	50,004
25-29	29	2	0	0	0	0	0	0	0	31	54,606
30-34	28	15	3	0	0	0	0	0	0	46	56,382
35-39	16	8	26	1	0	0	0	0	0	51	66,431
40-44	7	4	13	5	2	0	0	0	0	31	69,200
45-49	10	2	7	11	5	1	0	0	0	36	85,332
50-54	8	3	7	10	5	3	0	0	0	36	74,636
55-59	5	1	6	3	1	2	1	0	0	19	80,050
60-64	3	2	4	4	2	1	0	0	0	16	78,483
65 & Up	2	0	2	0	2	0	0	0	0	6	73,188
Total	109	37	68	34	17	7	1	0	0	273	

Average Age = 42.4
 Average Service = 9.1
 Average Annual Salary = \$69,026

Age Group	Females									Total	Average Annual Salary
	Years of Service										
	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+		
15-19	0	0	0	0	0	0	0	0	0	0	\$0
20-24	10	0	0	0	0	0	0	0	0	10	44,818
25-29	194	20	0	0	0	0	0	0	0	214	54,264
30-34	191	350	55	0	0	0	0	0	0	596	59,236
35-39	89	142	253	17	0	0	0	0	0	501	64,760
40-44	38	26	56	53	2	0	0	0	0	175	73,156
45-49	30	18	24	28	6	1	0	0	0	107	72,092
50-54	15	13	20	19	9	8	1	0	0	85	75,638
55-59	15	8	32	17	6	3	1	0	0	82	71,186
60-64	10	4	8	14	8	1	2	1	0	48	72,470
65 & Up	1	4	5	0	3	0	0	0	0	13	77,341
Total	593	585	453	148	34	13	4	1	0	1,831	

Average Age = 37.7
 Average Service = 8.3
 Average Annual Salary = \$63,941

* Excludes 11,766 terminated noncontributory records

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION V - CENSUS DATA

(continued)

H. Age and Benefit Profiles

Terminated Vested Participants

Age	Male		Female		Total	
	Number	Annual Pension	Number	Annual Pension	Number	Annual Pension
Under 35	0	\$0	0	\$0	0	\$0
35-39	0	\$0	1	\$9,168	1	9,168
40-44	1	\$22,092	5	\$56,340	6	78,432
45-49	4	\$80,568	19	\$244,860	23	325,428
50-54	5	\$79,068	35	\$514,608	40	593,676
55-59	14	\$284,748	36	\$458,652	50	743,400
60 & Up	<u>11</u>	<u>\$151,644</u>	<u>75</u>	<u>\$1,404,156</u>	<u>86</u>	<u>1,555,800</u>
Total	35	\$618,120	171	\$2,687,784	206	\$3,305,904
Average Age		=	55.9			
Average Annual Pension		=	\$16,048			

Service Retired Participants

Age	Male		Female		Total	
	Number	Annual Pension	Number	Annual Pension	Number	Annual Pension
Under 50	2	\$64,576	11	\$218,085	13	\$282,661
50-54	63	2,629,513	218	7,427,625	281	10,057,138
55-59	514	25,551,459	1,918	89,270,077	2,432	114,821,536
60-64	2,295	112,813,700	8,427	363,200,180	10,722	476,013,880
65-69	6,495	317,956,629	18,517	794,704,425	25,012	1,112,661,054
70-74	7,801	373,531,800	16,317	664,734,611	24,118	1,038,266,411
75-79	4,728	219,215,063	9,122	348,788,448	13,850	568,003,511
80-84	2,887	128,311,342	5,272	185,392,828	8,159	313,704,170
85-89	1,920	77,447,429	3,751	115,296,148	5,671	192,743,577
90-94	695	23,847,268	1,883	46,155,411	2,578	70,002,679
95-99	120	3,346,274	596	12,250,087	716	15,596,361
100 & Up	<u>9</u>	<u>187,046</u>	<u>98</u>	<u>1,694,966</u>	<u>107</u>	<u>1,882,012</u>
Total	27,529	\$1,284,902,099	66,130	\$2,629,132,891	93,659	\$3,914,034,990
Average Age		=	72.3			
Average Annual Pension		=	\$41,790			

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION V - CENSUS DATA

(continued)

H. Age and Benefit Profiles (continued)

Disabled Retired Participants

Age	Male		Female		Total	
	<u>Number</u>	<u>Annual Pension</u>	<u>Number</u>	<u>Annual Pension</u>	<u>Number</u>	<u>Annual Pension</u>
Under 35	0	\$0	0	\$0	0	\$0
35-39	7	190,866	22	577,398	29	768,264
40-44	14	378,585	51	1,380,339	65	1,758,924
45-49	27	843,727	91	2,755,755	118	3,599,482
50-54	44	1,415,605	148	4,533,859	192	5,949,464
55-59	52	1,763,545	292	8,919,477	344	10,683,022
60-64	119	3,628,193	483	15,262,956	602	18,891,149
65-69	179	5,470,262	626	18,781,450	805	24,251,712
70-74	165	4,898,381	523	15,226,572	688	20,124,953
75-79	74	1,994,757	299	8,166,793	373	10,161,550
80-84	48	1,172,559	158	4,054,177	206	5,226,736
85 & Up	<u>25</u>	<u>438,895</u>	<u>106</u>	<u>2,150,477</u>	<u>131</u>	<u>2,589,372</u>
Total	754	\$22,195,375	2,799	\$81,809,253	3,553	\$104,004,628
		Average Age	=	66.7		
		Average Annual Pension	=	\$29,272		

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION V - CENSUS DATA

(continued)

H. Age and Benefit Profiles (continued)

Beneficiaries and Dependents

<u>Age</u>	<u>Male</u>		<u>Female</u>		<u>Total</u>	
	<u>Number</u>	<u>Annual Pension</u>	<u>Number</u>	<u>Annual Pension</u>	<u>Number</u>	<u>Annual Pension</u>
Under 25	3	\$37,330	2	\$30,825	5	\$68,155
25-29	3	60,064	6	72,698	9	132,762
30-34	6	48,105	8	84,020	14	132,125
35-39	12	113,379	16	209,136	28	322,515
40-44	13	214,502	17	462,581	30	677,083
45-49	21	454,486	30	613,824	51	1,068,310
50-54	39	773,714	39	891,447	78	1,665,161
55-59	43	980,873	105	2,685,481	148	3,666,354
60-64	141	3,442,129	206	5,819,818	347	9,261,947
65-69	270	6,703,892	476	14,619,997	746	21,323,889
70-74	428	10,523,892	711	21,728,173	1,139	32,252,065
75-79	291	6,822,621	767	22,604,175	1,058	29,426,796
80-84	222	4,997,009	833	24,493,059	1,055	29,490,068
85-89	191	4,109,362	725	19,764,564	916	23,873,926
90-94	93	1,423,574	398	8,577,476	491	10,001,050
95-99	33	453,363	139	2,336,606	172	2,789,969
100 & Up	<u>5</u>	<u>52,892</u>	<u>24</u>	<u>417,490</u>	<u>29</u>	<u>470,382</u>
Total	1,814	41,211,187	4,502	125,411,370	6,316	166,622,557
		Average Age	=	76.7		
		Average Annual Pension	=	\$26,381		

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS
AS OF JUNE 30, 2017

This summary of actuarial assumptions is based on the Experience Study covering the period July 1, 2012 through June 30, 2015, unless noted otherwise.

A. Actuarial Assumptions

Interest: 7.5% per annum, compounded annually (as prescribed by the State Treasurer).

Salary Scale: Salary increases vary by years of employment and time period averaging 3.40% for periods prior to June 30, 2026 and averaging 4.21% thereafter. Average percentages based on 2015 Experience Study. Schedule of annual rates are shown below.

<u>Years of Employment</u>	<u>Period Ending June 30, 2026</u>	<u>Ultimate Period</u>
0-8	3.80%	4.90%
9-12	4.55	5.45
13	4.30	5.30
14	4.15	4.95
15	3.95	4.55
16	3.40	4.00
17	3.15	3.65
18	2.85	3.45
19	2.70	3.20
20	2.50	3.10
21	2.25	2.75
22	2.00	2.60
23-25	1.90	2.45
26-30	1.70	2.30
31+	1.55	2.00

Increases in Compensation Limits: The IRC Section 401(a)(17) limit is assumed to increase 2.3% per annum through June 30, 2026 and 2.6% thereafter, compounded annually. The Social Security Taxable Wage Base is assumed to increase 3.3% per annum through June 30, 2026 and 3.6% thereafter. The actual amount of \$128,400 is used for the 2018 plan year.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY
SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS
AS OF JUNE 30, 2017

A. Actuarial Assumptions (Continued)

Termination: Withdrawal rates vary by age, years of employment and gender. Illustrative rates are shown below:

Less Than 10 Years of Employment

<u>Years of Employment</u>	<u>Male</u>	<u>Female</u>	
		<u><40</u>	<u>40+</u>
0	10.23%	9.66%	10.96%
1	7.64	6.80	7.57
2	6.89	6.58	6.85
3	5.12	5.39	5.16
4	3.46	4.76	3.18
5	2.77	4.49	2.75
6	2.09	4.30	2.07
7	1.85	3.98	1.78
8	1.50	3.80	1.38
9	1.25	3.23	1.39

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS
AS OF JUNE 30, 2017

A. Actuarial Assumptions (Continued)

Annual Rates for Those With Deferred Annuity Benefits*

<u>Age</u>	<u>10-14 Years of Employment</u>		<u>15-19 Years of Employment</u>		<u>20-24 Years of Employment</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
30	0.67%	2.30%	0.47%	2.08%	0.27%	0.55%
35	0.63	1.88	0.42	1.40	0.27	0.55
40	0.60	1.17	0.38	0.70	0.26	0.43
45	0.63	0.74	0.36	0.46	0.25	0.27
50	0.77	0.22	0.50	0.48	0.31	0.28
55	1.10	1.20	0.83	0.80	0.54	0.53

*Members must have attained 10 years of service or 60 years of age (62 years of age for Class E and F members, 65 years of age for Class G members) in order to receive an annuity benefit.

Annual Rates for Those Receiving Return of Contributions

<u>Age</u>	<u>10-14 Years of Employment</u>		<u>15-19 Years of Employment</u>		<u>20-24 Years of Employment</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
30	0.45%	0.77%	0.31%	0.69%	0.18%	0.19%
35	0.42	0.62	0.28	0.47	0.18	0.19
40	0.39	0.39	0.25	0.24	0.18	0.14
45	0.42	0.25	0.25	0.15	0.16	0.09
50	0.33	0.24	0.22	0.16	0.13	0.09
55	0.28	0.21	0.21	0.14	0.13	0.09

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS
AS OF JUNE 30, 2017

A. Actuarial Assumptions (Continued)

Retirement: Rates of retirement vary by age, gender and eligibility for an unreduced pension and post-retirement medical benefits.

The rates listed below are for members hired prior to July 1, 2007 (Class A and B employees). Illustrative rates are shown below.

	<u>Less than Age 55 or</u>		<u>Attainment of Age 55 and 25 Years of Service</u>			
	<u>Less than 25</u>		<u>First</u>		<u>After First</u>	
	<u>Years of Service</u>		<u>Eligibility</u>		<u>Eligibility</u>	
<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
<47	1.2%	1.2%	N/A	N/A	N/A	N/A
48	1.5	1.5	N/A	N/A	N/A	N/A
49	1.7	1.7	N/A	N/A	N/A	N/A
50	2.0	2.0	N/A	N/A	N/A	N/A
51	2.4	2.4	N/A	N/A	N/A	N/A
52	2.8	2.8	N/A	N/A	N/A	N/A
53	3.8	3.8	N/A	N/A	N/A	N/A
54	4.8	4.8	N/A	N/A	N/A	N/A
55	N/A	N/A	15.0%	17.0%	N/A	N/A
56	N/A	N/A	22.0	19.0	12.0%	13.0%
57	N/A	N/A	22.0	19.0	13.0	14.0
58	N/A	N/A	28.0	27.0	14.0	15.0
59	N/A	N/A	28.0	27.0	16.0	17.0
60	7.0	5.0	35.0	33.0	20.0	21.0
61	6.5	5.0	32.0	38.0	22.5	23.0
62	8.0	7.5	45.0	50.0	35.0	32.0
63	9.0	7.5	45.0	50.0	30.0	29.0
64	9.0	7.5	45.0	50.0	30.0	29.0
65	14.0	12.0	50.0	55.0	33.0	33.0
66-70	18.0	15.0	55.0	55.0	30.0	30.0
71+	19.0	16.0	55.0	55.0	27.0	30.0

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS
AS OF JUNE 30, 2017

A. Actuarial Assumptions (Continued)

The rates listed below are for members hired on or after July 1, 2007 and before November 2, 2008 (Class D employees). Illustrative rates are shown below.

	<u>Less than Age 60 or</u>		<u>Attainment of Age 60 and 25 Years of Service</u>			
	<u>Less than 25</u>		<u>First</u>		<u>After First</u>	
	<u>Years of Service</u>		<u>Eligibility</u>		<u>Eligibility</u>	
<u>Age</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
<47	0.6%	0.6%	N/A	N/A	N/A	N/A
48	0.8	0.8	N/A	N/A	N/A	N/A
49	0.9	0.9	N/A	N/A	N/A	N/A
50	1.0	1.0	N/A	N/A	N/A	N/A
51	1.2	1.2	N/A	N/A	N/A	N/A
52	1.4	1.4	N/A	N/A	N/A	N/A
53	1.9	1.9	N/A	N/A	N/A	N/A
54	2.4	2.4	N/A	N/A	N/A	N/A
55	11.5	11.5	N/A	N/A	N/A	N/A
56	12.0	12.0	N/A	N/A	N/A	N/A
57	12.5	12.5	N/A	N/A	N/A	N/A
58	13.5	13.5	N/A	N/A	N/A	N/A
59	14.0	14.0	N/A	N/A	N/A	N/A
60	7.0	5.0	32.0%	31.0%	N/A	N/A
61	6.5	5.0	32.0	38.0	22.5%	23.0%
62	8.0	7.5	45.0	50.0	35.0	32.0
63	9.0	7.5	45.0	50.0	30.0	29.0
64	9.0	7.5	45.0	50.0	30.0	29.0
65	14.0	12.0	50.0	55.0	33.0	33.0
66-70	18.0	15.0	55.0	55.0	30.0	30.0
71+	19.0	16.0	55.0	55.0	27.0	30.0

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS
AS OF JUNE 30, 2017

A. Actuarial Assumptions (Continued)

The rates listed below are for members hired after November 1, 2008 and before June 28, 2011 (Class E and Class F employees). Illustrative rates are shown below.

<u>Less than Age 62 or Less than 25 Years of Service</u>			<u>Attainment of Age 62 and 25 Years of Service</u>			
<u>Age</u>			<u>First Eligibility</u>		<u>After First Eligibility</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
<47	0.6%	0.6%	N/A	N/A	N/A	N/A
48	0.7	0.7	N/A	N/A	N/A	N/A
49	0.8	0.8	N/A	N/A	N/A	N/A
50	0.9	0.9	N/A	N/A	N/A	N/A
51	1.1	1.1	N/A	N/A	N/A	N/A
52	1.3	1.3	N/A	N/A	N/A	N/A
53	1.7	1.7	N/A	N/A	N/A	N/A
54	2.2	2.2	N/A	N/A	N/A	N/A
55	10.5	10.5	N/A	N/A	N/A	N/A
56	10.8	10.8	N/A	N/A	N/A	N/A
57	11.0	11.0	N/A	N/A	N/A	N/A
58	12.0	12.0	N/A	N/A	N/A	N/A
59	12.5	12.5	N/A	N/A	N/A	N/A
60	20.0	20.0	N/A	N/A	N/A	N/A
61	22.0	22.0	N/A	N/A	N/A	N/A
62	30.0	24.0	50.0%	46.0%	N/A	N/A
63	9.0	7.5	45.0	50.0	30.0%	29.0%
64	9.0	7.5	45.0	50.0	30.0	29.0
65	14.0	12.0	50.0	55.0	33.0	33.0
66-70	18.0	15.0	55.0	55.0	30.0	30.0
71+	19.0	16.0	55.0	55.0	27.0	30.0

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS
AS OF JUNE 30, 2017

A. Actuarial Assumptions (Continued)

The rates listed below are for members hired on or after June 28, 2011 (Class G employees). Illustrative rates are shown below.

	<u>Less than Age 65 or Less than 30 Years of Service</u>		<u>Attainment of Age 65 and 30 Years of Service</u>			
	<u>Age</u>		<u>First Eligibility</u>		<u>After First Eligibility</u>	
			<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
<47	0.3%	0.3%	N/A	N/A	N/A	N/A
48	0.4	0.4	N/A	N/A	N/A	N/A
49	0.4	0.4	N/A	N/A	N/A	N/A
50	0.5	0.5	N/A	N/A	N/A	N/A
51	0.6	0.6	N/A	N/A	N/A	N/A
52	0.7	0.7	N/A	N/A	N/A	N/A
53	0.9	0.9	N/A	N/A	N/A	N/A
54	1.1	1.1	N/A	N/A	N/A	N/A
55	5.0	5.0	N/A	N/A	N/A	N/A
56	6.0	6.0	N/A	N/A	N/A	N/A
57	7.0	7.0	N/A	N/A	N/A	N/A
58	8.0	8.0	N/A	N/A	N/A	N/A
59	9.0	9.0	N/A	N/A	N/A	N/A
60	15.0	15.0	N/A	N/A	N/A	N/A
61	16.0	16.0	N/A	N/A	N/A	N/A
62	36.0	32.0	N/A	N/A	N/A	N/A
63	28.0	28.0	N/A	N/A	N/A	N/A
64	28.0	28.0	N/A	N/A	N/A	N/A
65	40.0	40.0	50.0%	55.0%	N/A	N/A
66-70	18.0	15.0	55.0	55.0	30.0%	30.0%
71+	19.0	16.0	55.0	55.0	27.0	30.0

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS
AS OF JUNE 30, 2017

A. Actuarial Assumptions (Continued)

Disability: Incidence of ordinary disabilities among active members apply upon the attainment of 10 years of service until the attainment of first eligibility for retirement. For members eligible for early retirement, the greater of the early retirement and disability benefit is valued. The rates vary by age, gender and type of disability. Illustrative rates are shown below:

<u>Age</u>	<u>Ordinary</u>		<u>Accidental</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
25	0.0301%	0.0379%	0.0060%	0.0060%
30	0.0473	0.0550	0.0060	0.0060
35	0.0609	0.0674	0.0060	0.0060
40	0.0701	0.0893	0.0060	0.0060
45	0.1023	0.1317	0.0060	0.0060
50	0.1421	0.1759	0.0060	0.0060
55	0.4686	0.3506	0.0060	0.0060

For Class F and G members assumed to receive a disability benefit under Chapter 3, P.L. 2010, it is assumed that these members will begin receiving their retirement benefit at age 70. The valuation excludes benefits paid from any disability income policy prior to retirement since these benefits are not paid from TPAF.

Pre-retirement Mortality: RP-2006 employee mortality table with white collar adjustments setback 5 years for females and 3 years for males. Mortality improvements are projected using a 60-year average of rates of improvement using Social Security data from 1953 to 2013. Illustrative rates for the base year are shown below. No accidental deaths are assumed.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS
AS OF JUNE 30, 2017

A. Actuarial Assumptions (Continued)

<u>Age</u>	<u>Ordinary</u>		<u>Mortality Improvement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
25	0.0412%	0.0171%	0.82%	0.82%
30	0.0341	0.0157	0.76	0.76
35	0.0348	0.0176	0.91	0.91
40	0.0428	0.0253	1.18	1.18
45	0.0624	0.0398	1.18	1.18
50	0.1043	0.0640	1.19	1.19
55	0.1649	0.0971	1.17	1.17
60	0.2488	0.1464	1.24	1.24
65	0.4482	0.2358	1.25	1.25
70	0.8588	0.3783	1.22	1.22

Post-retirement Mortality: Rates of mortality vary by age, gender and type of retirement. For service retirees and beneficiaries, rates are based on RP-2006 white collar mortality table for males and females, with adjustments. For disabled annuitants, rates are equal to 90% of the mortality rates of the RP-2006 disability annuitant table for males and females. For non-disabled annuitants, mortality improvements are projected using a 60-year average of rates of improvement using Social Security data from 1953 to 2013. Illustrative rates are shown below:

<u>Age</u>	<u>Service Retirements and Beneficiaries</u>		<u>Mortality Improvement</u>		<u>Disability Retirement</u>	
	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>	<u>Male</u>	<u>Female</u>
45	0.0787%	0.0512%	1.18%	1.18%	1.9031%	0.9402%
50	0.3018	0.1735	1.19	1.19	2.1547	1.1194
55	0.3867	0.2253	1.17	1.17	2.2379	1.3512
60	0.5135	0.3563	1.24	1.24	2.5300	1.7513
65	0.8079	0.6354	1.25	1.25	3.2681	2.2769
70	1.3954	1.0254	1.22	1.22	4.3931	3.0828
75	2.4953	1.7459	1.16	1.16	6.0309	4.4208
80	4.5899	3.1836	1.10	1.10	8.4835	6.5331
85	8.6900	6.0945	0.79	0.79	12.3392	9.7648

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS AS OF JUNE 30, 2017

Non-contributory Active Members: Unit Credit cost method.

Beneficiaries: 100% of active members are assumed to have a beneficiary for receipt of the lump sum death benefit or employee contribution refund upon death.

Form of Payment: Modified Cash Refund Annuity.

Member Annuity: Valuation mortality and interest are assumed to be the basis for determining the member annuity in future years.

Special Data Adjustments:

- Determination of employee type is based on Class Code as provided by the Division.
- For non-contributory members where no salary was provided, no date of birth was provided, or ASF was negative a liability equal to the ASF was held.
- For terminated non-contributory members, the liability is based on an estimated benefit using the provided ASF and last known salary.
- For beneficiaries where no gender code or date of birth was provided, reasonable assumptions were made based on records provided in prior years or the deceased retiree's records. For retirees with a joint annuitant option code that was missing a spouse's date of birth, husbands are assumed to be 3 years older than wives. All such records were included in the valuation.
- Retiree members where no benefit and monthly allowance was provided, or no cause, class, or option was provided, were excluded from the valuation.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VI - ACTUARIAL ASSUMPTIONS AND METHODS AS OF JUNE 30, 2017

B. Actuarial Valuation Method

The Projected Unit Credit Method was used as required by Chapter 62, P.L. 1994 as modified by Chapters 115, P.L. 1997 and 133, P.L. 2001 for active contributory members. The minimum actuarial accrued liability was equal to the greater of formula benefit under the Projected Unit Credit Cost method, the value of the estimated member annuity as of the valuation date and the contributions with interest as of the valuation date provided by the Division. The normal cost was determined using the same methodology but reflecting an additional year of service and contributions less the final amount determined for the actuarial accrued liability.

C. Asset Valuation Method

The actuarial value is equal's the prior year' actuarial value increased with interest and cash flows plus 20% of the difference between it and the market value of assets. Cash flows are based on an accrual accounting approach. This method is prescribed by statute.

D. Changes in Actuarial Assumptions

This valuation reflects a reduction in the investment return assumption from 7.65% to 7.5% as prescribed by the State Treasurer.

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Section VI – D

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VII – SUMMARY OF PRINCIPAL PLAN PROVISIONS AS OF JUNE 30, 2017

This summary of plan provisions is intended only to describe the essential features of the plan. All eligibility requirements and benefit amounts shall be determined in strict accordance with the plan document itself.

1. Type of Plan

The Plan is a contributory, defined benefit plan. Effective October 1, 2011, contributions by Members are 6.5% and increase by 1/7 of 1% each July thereafter until an ultimate rate of 7.5% is attained on July 1, 2018. As of July 1, 2017, the contribution rate is 7.34%. For members hired on or after July 1, 2007, compensation for contributions is capped at the Social Security Taxable Wage Base (\$127,200 for 2017 and \$128,400 for 2018). For compensation in excess of the Social Security Taxable Wage Base, contributions on the excess compensation are made to the Defined Contribution Retirement Program.

2. Effective Date

The Plan was established in 1919. It was reorganized and integrated with Social Security in 1955. Social Security integration was eliminated in 1966, i.e., reductions in retirement benefits based on Social Security benefits were eliminated.

3. Eligibility for Membership

Employees, appointed to positions requiring certification as members of a regular teaching or professional staff of a public school system in New Jersey, are required to enroll as a condition of employment. Employees of the Department of Education holding unclassified, professional and certificated titles are eligible for membership. Temporary or substitute employees are not eligible. The eligible employee must be scheduled to work at least 32 hours per week effective May 22, 2010, per Chapter 1, P.L. 2010.

4. Definitions

- a. Fiscal Year: A Fiscal Year is a 12-month period beginning on July 1 and ending on June 30.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VII – SUMMARY OF PRINCIPAL PLAN PROVISIONS AS OF JUNE 30, 2017

4. Definitions (continued)

- b. Credited Service: A year of Credited Service for each year an employee is a Member of the Retirement System plus service, if any, covered by a prior service liability. Class F members must be scheduled to work at least 32 hours per week, Class E members must have an annual salary of \$7,500 (indexed for inflation) and other members must have an annual salary of \$500.
- c. Final Compensation: This is the average annual compensation upon which contributions by a member are based on the period consecutive years of Creditable Service immediately preceding retirement or the period of highest fiscal years of Membership Service. The period equals three for members hired prior to May 22, 2010 and five for Class F and later members.
- d. Final Year Compensation: This is the compensation upon which contributions by a Member to the Annuity Savings Fund are based in the last year of Membership Service.
- e. Aggregate Member Contributions: This is the sum of all amounts deducted from the compensation of a Member or contributed by him or on his behalf without interest.
- f. Class A Member: Any member who contributes towards retirement allowance based on 1/64th benefit rate per year of creditable service.
- g. Class B Member: Any member hired prior to July 1, 2007 who contributes towards a retirement allowance based on 1/55th benefit rate per year of creditable service.
- h. Class D Member: Any member hired on or after July 1, 2007 and before November 2, 2008, who contributes up to the Social Security Taxable Wage Base towards a retirement allowance based on 1/55th benefit rate per year of creditable service payable at age 60.
- i. Class E Member: Any member hired after November 1, 2008 and before May 22, 2010 who contributes up to the Social Security Taxable Wage Base towards a retirement allowance based on 1/55th benefit rate per year of creditable service payable at age 62.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VII – SUMMARY OF PRINCIPAL PLAN PROVISIONS AS OF JUNE 30, 2017

4. Definitions (continued)

- j. Class F Member: Any member hired after May 21, 2010 and before June 28, 2011 who contributes up to the Social Security Taxable Wage Base towards a retirement allowance based on 1/60th benefit rate per year of creditable service payable at age 62.
- k. Class G Member: Any member hired on or after June 28, 2011 who contributes up to the Social Security Taxable Wage Base towards a retirement allowance based on 1/60th benefit rate per year of creditable service payable at age 65.

5. Cost-of-Living Adjustment

The Pension Adjustment Program provides a cost-of-living adjustment (COLA) to retirees and their survivors who receive a monthly retirement allowance from the TPAF. The first adjustment is received in the 25th month after the member's retirement. Subsequent cost-of-living adjustments are computed annually and are first reflected in February. The rate of increase is equal to 60 percent of the percentage change between the average CPI for the 12 month period ending December 31 in the year of retirement and the August 31 preceding the February adjustment. Pension adjustments to be paid on or after July 1, 2011 have been eliminated for all members unless the Target Funded Ratio is met as of the valuation date and for each of the subsequent 30 years on a projected basis.

6. Retirement Benefits

a. Service Retirement

Service Retirement Eligibility: Eligibility means age 60 (Class A, B, and D), age 62 (Class E and F) or age 65 (Class G) with no minimum service requirement.

Service Retirement Benefit: An employee's annual service retirement allowance is equal to a member annuity plus an employer pension which together equals 1/64th of Final Compensation for each year of service for Class A members, 1/55th of Final Compensation for each year of service for Class B, D and E members and 1/60th of Final Compensation for each year of service for Class F and G members. The member annuity is based on the member contributions credited at the valuation interest rate.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY
SECTION VII – SUMMARY OF PRINCIPAL PLAN PROVISIONS
AS OF JUNE 30, 2017

6. Retirement Benefits (continued)

Note: See Section 12 for special benefits for veteran members.

b. Early Retirement

Early Retirement Eligibility: Class A, B, D, E and F members may retire after completion of 25 years of Creditable Service and Class G members may retire after completion of 30 years of Creditable Service.

Early Retirement Benefit: The benefit may be either:

- (i) the lump sum withdrawal benefit described in 7.a. below; or
- (ii) the Service Retirement Benefit reduced by 1/4 of one percent for each month the retirement date precedes age 55 for Class B members; or
- (iii) the Service Retirement Benefit reduced by 1/12 of one percent for each month the retirement date precedes age 60 but over age 55 and by ¼ of one percent for each month the retirement date precedes age 55, for Class D members.
- (iv) the Service Retirement Benefit reduced by 1/12 of one percent for each month the retirement date precedes age 62 but over age 55 and by ¼ of one percent for each month the retirement date precedes age 55, for Class E and F members.
- (v) the Service Retirement Benefit reduced by ¼ of one percent for each month the retirement date precedes age 65, for Class G members.

c. Deferred Retirement

Eligibility: A Member is eligible upon termination of service prior to age 60 (Class A, B, D), age 62 (Class E and Class F) or age 65 (Class G) and after 10 years of Creditable Service.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VII – SUMMARY OF PRINCIPAL PLAN PROVISIONS
AS OF JUNE 30, 2017

6. Retirement Benefits (continued)

Deferred Retirement Benefit: The benefit may be either:

- (i) the lump sum withdrawal benefit described in 7.a. above; or
- (ii) a deferred retirement benefit, commencing at age 60 (Class A, B, D), age 62 (Class E and Class F) or age 65 (Class G), equal to a member annuity plus an employer pension which together provide a retirement allowance equal to the service retirement benefit based on Final Compensation and Creditable Service at date of termination. Member annuity based on member contributions credited at the valuation interest rate.

7. Termination Benefits

a. Lump Sum Withdrawal

Eligibility: A Member is eligible upon termination of service.

Lump Sum Withdrawal Benefit: The benefit equals a refund of Aggregate Member Contributions plus, if the member has completed three years of service, interest accumulated at 2.0% per annum allowed thereon.

8. Death Benefits

a. Ordinary Death (Insured) Benefit - Lump Sum (Non-Contributory)

Pre-retirement Death Benefit Eligibility: Any current active member is eligible.

Pre-retirement Death Benefit: The benefit is a lump sum benefit equal to the Aggregate Contributions with interest allowed thereon plus an amount equal to 1-1/2 times Compensation at date of death.

Post-retirement Death Benefit Prior to Age 60 (Class A, B, D), Age 62 (Class E and Class F) or Age 65 (Class G) Eligibility: Eligible if disabled or retired early.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VII – SUMMARY OF PRINCIPAL PLAN PROVISIONS
AS OF JUNE 30, 2017

8. Death Benefits (continued)

Post-retirement Death Benefit Prior to Age 60 (Class A, B, D), Age 62 (Class E and Class F) or Age 65 (Class G) Benefit: The benefit is as follows:

- (i) For death while a Disabled Retiree the benefit is equal to 1-1/2 times Compensation.
- (ii) For death while an Early Retiree, the benefit is equal to 3/16 times Compensation.
- (iii) For death while vested terminated, the benefit is equal to his Aggregate Contributions with interest allowed thereon.

Post-retirement Death Benefit After Age 60 (Class A, B, D), Age 62 (Class E and F) or Age 65 (Class G) Eligibility: Eligible after attainment of service retirement, deferred and disabled retirements (if not disabled, 10 years of Creditable Service required for members enrolling on or after July 1, 1971).

Post-retirement Death Benefit After Age 60 (Class A, B, D), Age 62 (Class E and F) or Age 65 (Class G) Benefit: The benefit payable is equal to 3/16 times Compensation.

- b. Contributory Death Benefit: An additional, employee-paid, death benefit is also available through group insurance purchased by the Board of Trustees. Contributions for this benefit are required by Members during the first year of enrollment. Participation may be terminated after the first year. The benefit prior to retirement is 2 times compensation. The benefit after retirement is 1/4 times final year compensation (coverage at retirement, and 10 years of participation for Members enrolling on or after July 1, 1970, is required).
- c. Pre-retirement Accidental Death Benefit:

Eligibility: A death resulting from injuries received from an accident during performance of duty and not a result of willful negligence is eligible.

Pre-retirement Lump Sum Benefit: The benefit is a lump sum equal to 1-1/2 times Compensation.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VII – SUMMARY OF PRINCIPAL PLAN PROVISIONS AS OF JUNE 30, 2017

8. Death Benefits (continued)

Pre-retirement Accidental Death Benefit: The benefit payable is as follows:

- (i) The annuity benefit to a widow or widower is equal to 50% of Compensation, payable for life or until remarriage.
- (ii) The annuity benefit, when there is no spouse, or the spouse is remarried, is equal to 20% of Compensation for one child, 35% for two children, 50% for three or more children. The benefit is payable while the children are under age 18 and it is payable for life if they are disabled.
- (iii) The annuity benefit, when there is no spouse or children, is equal to 25% of Compensation for one dependent parent and 40% for two dependent parents.
- (iv) The benefit, when there is no relation as stated above, is equal to the Aggregate Contributions with interest allowed thereon and is payable to a beneficiary or to the Member's estate. This is also the minimum benefit payable under (i), (ii) and (iii) above.

9. Disability Benefits

a. Ordinary Disability Retirement

Eligibility: A Member is eligible for Ordinary Disability Retirement if he (she) has 10 years of Creditable Service and is totally and permanently incapacitated from the performance of usual or available duties.

Ordinary Disability Retirement Benefit for Class A, B, D and E members: The total retirement allowance is equal to the greater of:

- (i) 1.64% of Final Compensation times the number of years of Creditable Service; or
- (ii) 43.6% of Final Compensation.

Note: See Section 12 for special benefits for veteran members.

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TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

SECTION VII – SUMMARY OF PRINCIPAL PLAN PROVISIONS
AS OF JUNE 30, 2017

9. Disability Benefits (continued)

Ordinary and Accidental Disability Retirement Benefit for Class F and G members: A disability benefit equal to 60% of salary reduced by the initial Social Security benefit is paid until the earlier of age 70 or commencement of a retirement benefit from a disability income policy outside of TPAF. The policy also makes employee contributions during the period of disability.

b. Accidental Disability Retirement for Class A, B, D and E members

Eligibility: A Member is eligible upon total and permanent incapacitation as a direct result of a traumatic event occurring during and as a result of the performance of regular or assigned duties.

Accident Disability Retirement Benefit: The benefit payable is equal to a Member annuity plus an employer pension which together equals 72.7% of the Compensation at date of injury.

10. Additional Old-Plan Benefit: An additional pension is payable to any retiree who was a member of the old Teachers' Retirement Fund. This pension is the actuarial equivalent of his contributions to the old Teachers' Retirement Fund without interest.

11. Special Minimum Benefit: A member who retired prior to 1955 with 20 or more years of service may receive a minimum pension of \$500 a month inclusive of any amounts payable under any pension adjustments.

12. Special Benefits for Veterans:

a. Service Retirement: Eligible if member attains age 60 and completes 20 years of service or attains age 55 and completes 25 years of service. Benefit equals 54.5% of highest 12-month contributory compensation.

b. Chapter 97 Benefit: Eligible if age 55 and completes 35 years of service. Benefit equals 1/55th of final year compensation for each year of service.

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13. Benefit and Compensation Limits

The provisions of IRC Section 415 and IRC Section 401(a)(17), which limit benefits paid and limit compensation used in determining benefits, has been reflected in this report. The IRC Section 415 limit is \$215,000 and the 401(a)(17) compensation cap is \$270,000 for 2017 and is applied on a calendar year basis.

14. Forms of Payment

- a. Maximum Option – Single life annuity.
- b. Option 1 – Single life annuity with return of reserve option.
- c. Option 2 – 100% joint and survivor annuity.
- d. Option 3 – 50% joint and survivor annuity.
- e. Option 4 – Other percentage joint and survivor annuity.
- f. Option A – 100% pop-up joint and survivor annuity.
- g. Option B – 75% pop-up joint and survivor annuity.
- h. Option C – 50% pop-up joint and survivor annuity.
- i. Option D – 25% pop-up joint and survivor annuity.

15. Contributions

- a. Member Contributions: Each member becoming a member on or after January 1, 1956 and prior to July 1, 2007 contributes at the rate of contribution applicable to Class B members. Any members hired after June 30, 2007 and prior to November 2, 2008 are Class D members. Members hired after November 1, 2008 and prior to May 22, 2010 are Class E members. Members hired after May 21, 2010 are Class F members and members hired after June 28, 2011 are Class G members.
 - (i) Class D, E, F or G Membership: Class D, E, F or G members contribute at their applicable contribution rate up to the Social Security Taxable Wage Base.
 - (ii) Class B Membership: Any member on December 31, 1955 may elect to be classified as a Class B member and contribute at the rate of contribution applicable to Class B members at his age at membership. Any such member may elect to increase his accumulated deductions by the amount required by the Board to receive credit as a Class B member for all or part of his service prior to such election.

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15. Contributions (continued)

- (iii) Class A Membership: Any member who is not a veteran and does not elect to be classified as a Class B member continues to contribute at the rate of contribution applicable to his age at membership which was payable prior to the establishment of the integrated system, except that if he became a member subsequent to June 30, 1946 he will pay after January 1, 1955 at the rate of contribution in effect on June 30, 1946 applicable to his age at membership.

Prior to July 1, 1979 different contribution rates were established for men and women. Effective on that date members contribute at rates intermediate between the rates previously applicable to male and female members, computed to provide the same present value of future employee contributions at each entry age on the basis of the membership as constituted on the effective date.

b. Local Employer Contributions

- (i) Early Retirement Incentive Contributions: The State and Local employers which elected to participate in the early retirement incentive programs authorized by Chapters 137, 229 and 231, P.L. 1991, Chapters 48, 138 and 163, P.L. 1993, Chapter 23, P.L. 2001 and Chapters 128 and 129, P.L. 2003 pay contributions to cover the additional liability for these programs over amortization periods chosen by the employer (15 years for Chapters 128 and 129) or the amortization period for the Unfunded Accrued Liability of the system (Chapter 23, P.L. 2002 and Chapter 21, P.L. 2008). The remaining present values are re-amortized upon changes to the interest rate assumption. Effective with the revised June 30, 2011 actuarial valuation, for any local employer with an increasing payment amortization schedule, the increase factor is 3.25%
- (ii) Chapter 113 Contributions: Certain School Districts have elected to exempt a select group of employees from the compensation limit under IRC Section 401(a)(17) incorporated under Chapter 113. These school districts will pay the full cost of this exemption at a member's date of retirement.

c. Lottery Enterprise Contributions: Actual revenue generated by the Lottery Enterprise will be deposited into three retirement systems on a monthly basis

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based on the allocable percentages specified in Statute for a term of 30 years from fiscal year 2018 to fiscal year 2047. The allocable percentages are 77.78% to TPAF, 21.02% to PERS and 1.20% to PFRS.

16. Changes in Plan Provisions Since Prior Valuation

Reflects adoption of Chapter 98, P.L. 2017 contributing the Lottery Enterprise to three retirement systems over a term of 30 years.

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Section VII

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

APPENDIX I - EARLY RETIREMENT INCENTIVE CONTRIBUTION SCHEDULE

<u>Group Number</u>	<u>Location Name</u>	<u>ERI 1 Present Value June 30, 2017</u>	<u>ERI 1 Fiscal Year 2019 Payment</u>	<u>ERI 2 Present Value June 30, 2017</u>	<u>ERI 2 Fiscal Year 2019 Payment</u>
3	981 NJ INST OF TECH	\$84,964	\$24,884	\$378,980	\$34,312
6	911 ALLAMUCHY BD OF ED	N/A	N/A	93,301	10,013
6	300 ASBURY PARK BD OF ED	1,379,937	404,153	N/A	N/A
6	969 ATLANTIC CO VOCATIONAL SCHOOLS	83,015	24,313	N/A	N/A
6	4015 BERLIN TWP BD OF ED	79,027	23,145	N/A	N/A
6	412 BOONTON TWP BD OF ED	53,818	15,762	N/A	N/A
6	774 BYRAM TWP BD OF ED	94,658	27,723	N/A	N/A
6	4017 CHESILHURST BORO BD OF ED	12,016	3,519	N/A	N/A
6	4018 CLEMENTON BD OF ED	44,706	13,094	N/A	N/A
6	753 GREEN BROOK BD OF ED	125,712	36,818	N/A	N/A
6	8082 GUTTENBERG BORO BD OF ED	67,613	19,803	N/A	N/A
6	956 HUDSON CO VOCATIONAL SCHOOL	N/A	N/A	626,727	67,258
6	521 LAKEHURST BORO BD OF ED	35,324	10,346	N/A	N/A
6	645 LAKELAND REGIONAL	317,584	93,013	N/A	N/A
6	111 MERCER CO SPECIAL SERVICES	157,024	45,989	N/A	N/A
6	346 MONMOUTH BEACH BD OF ED	43,057	12,611	N/A	N/A
6	987 MONMOUTH CO VOCATIONAL SCHOOLS	254,065	74,410	N/A	N/A
6	4069 PINE HILL BORO BD OF ED	\$114,301	\$33,476	N/A	N/A
6	5071 SHILOH TOWNSHIP	4,696	1,375	N/A	N/A
6	8070 WEST NEW YORK TWP BD OF ED	N/A	N/A	\$2,200,740	\$236,175
6	934 WHITE TWP BD OF ED	\$88,799	\$26,007	N/A	N/A
	Grand total for Local Employers	\$3,040,316	\$890,441	\$3,299,748	\$347,758

TEACHERS' PENSION AND ANNUITY FUND OF NEW JERSEY

APPENDIX I - EARLY RETIREMENT INCENTIVE CONTRIBUTION SCHEDULE

(continued)

<u>Group Number</u>	<u>Location Name</u>	ERI 3	ERI 3	ERI 4	ERI 4
		Present Value <u>June 30, 2017</u>	Fiscal Year <u>2019 Payment</u>	Present Value <u>June 30, 2017</u>	Fiscal Year <u>2019 Payment</u>
2	90400 EDUCATION DEPARTMENT	\$20,870,689	\$1,823,775	N/A	N/A
2	90416 MARIE KATZENBACK SCH FOR DEAF	\$3,714,069	\$324,552	N/A	N/A
2	90207 OFFICE OF ADM LAW	\$878,762	\$76,790	N/A	N/A
3	981 NJ INST OF TECH	\$871,401	\$76,147	N/A	N/A
4	90411 NEW JERSEY UNIVERSITY	\$4,333,206	\$378,655	N/A	N/A
4	90412 KEAN UNIVERSITY	\$2,266,507	\$198,058	N/A	N/A
4	90414 MONTCLAIR STATE UNIVERSITY	\$1,793,047	\$156,685	N/A	N/A
4	90410 ROWAN UNIVERSITY	\$735,008	\$64,228	N/A	N/A
4	90415 THE COLLEGE OF NEW JERSEY	\$460,858	\$40,272	N/A	N/A
4	90413 WILLIAM PATERSON UNIVERSITY	\$836,880	\$73,130	N/A	N/A
6	8083 HARRISON TWP BD OF ED	N/A	N/A	\$671,495	\$196,666
6	956 HUDSON CO VOCATIONAL SCHOOL	N/A	N/A	\$529,306	\$155,022
6	620 PASSAIC BD OF ED	N/A	N/A	\$8,287,547	\$2,427,240
Grand total for State Locations and Local Employers		\$36,760,427	\$3,212,292	\$9,488,348	\$2,778,928

<u>Group Number</u>	<u>Location Name</u>	ERI 5	ERI 5
		Present Value <u>June 30, 2017</u>	Fiscal Year <u>2019 Payment</u>
2	90400 EDUCATION DEPARTMENT	\$5,141,449	\$449,283
2	90416 MARIE KATZENBACK SCH FOR DEAF	\$1,504,083	\$131,434
Grand total for State Locations		\$6,645,532	\$580,717