



The Public Employees' Retirement System of New Jersey

**GASB 67 Report
as of June 30, 2019**

Produced by Cheiron

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**THE PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF NEW JERSEY
GASB 67 REPORTING FOR JUNE 30, 2019 MEASUREMENT DATE**

SECTION I – BOARD SUMMARY

The purpose of this report is to provide accounting and financial disclosure information under Governmental Accounting Standards Board Statement 67 for the Public Employees' Retirement System of New Jersey (PERS, Plan or System). This information includes:

- Projection of the Total Pension Liability from the valuation date to the measurement date,
- Calculation of the Net Pension Liability at the discount rate as well as discount rates 1% higher and lower than the discount rate, and
- Changes in the Net Pension Liability.

Highlights

The reporting date for the PERS is June 30, 2019. Measurements as of the reporting date are based on the fair value of assets as of June 30, 2019 and the Total Pension Liability as of the valuation date, July 1, 2018, updated to June 30, 2019. As a result of the Experience Study covering the period July 1, 2014 – June 30, 2018, the assumed rates of termination, retirement, mortality, disability, salary increases, and inflation were updated. To see a detailed comparison of the changes refer to the Experience Study. The assumed discount rate used to measure the Total Pension Liability was also changed as of the measurement date. We are not aware of any other significant events between the valuation date and the measurement date so the update procedures only include the addition of service cost and interest cost offset by actual benefit payments, and an adjustment to reflect the changes in assumptions.

The following table provides a summary of the key results during this reporting period broken out by State, Local Employers and in Total for the System.

Table I-1 Summary of Results		
Measurement Date	June 30, 2019	June 30, 2018
<u>State</u>		
Total Pension Liability	\$ 29,512,766,255	\$ 30,434,600,657
Plan Fiduciary Net Position	<u>6,500,345,915</u>	<u>6,730,302,564</u>
Net Pension Liability	\$ 23,012,420,340	\$ 23,704,298,093
<u>Local Employers</u>		
Total Pension Liability	\$ 41,491,463,886	\$ 42,431,573,511
Plan Fiduciary Net Position	<u>23,347,631,751</u>	<u>22,742,071,972</u>
Net Pension Liability	\$ 18,143,832,135	\$ 19,689,501,539
<u>Total</u>		
Total Pension Liability	\$ 71,004,230,141	\$ 72,866,174,168
Plan Fiduciary Net Position	<u>29,847,977,666</u>	<u>29,472,374,536</u>
Net Pension Liability	\$ 41,156,252,475	\$ 43,393,799,632

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SECTION II – CERTIFICATION

The purpose of this report is to provide accounting and financial reporting information under GASB 67 for the Public Employees' Retirement System of New Jersey (PERS). This report is for the use of PERS, the Division of Pensions and Benefits (DPB) and their auditors in preparing financial reports in accordance with applicable law and accounting requirements. This report is not appropriate for other purposes, including the measurement of funding requirements for PERS and estimating the price to settle PERS's obligations.

In preparing our report, we relied on information (some oral and some written) supplied by the Division of Pensions and Benefits. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23.

Future actuarial measurements may differ significantly from the current measurements 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; and changes in plan provisions or applicable law.

For purposes of this report, the projection of the Plan's contributions and projected benefit payments as of June 30, 2019 was based on the recommended demographic assumptions of the July 1, 2014 – June 30, 2018 Experience Study, approved by the Board of Trustees on February 19, 2020. The calculation of the Total Pension Liability as of June 30, 2019 was based on the same demographic assumptions except for the mortality assumption, which was based on the SOA's MP-2019 mortality improvement scale upon direction from the DPB. While we do not find the use of the SOA's Scale MP-2019 unreasonable, it does not reflect the analysis of actual mortality experience from our Experience Study which was the basis for our recommended mortality assumptions, including the mortality improvement scale.

Based on the State Treasurer's recommendation the following investment return assumptions are used to determine the actuarially determined contributions:

- Effective with the July 1, 2017 valuation: 7.50% per annum,
- Effective with the July 1, 2019 valuation: 7.30% per annum,
- Effective with the July 1, 2021 valuation: 7.00% per annum,

In accordance with Paragraph 40 of GASB Statement No. 67, the projection of the Plan's fiduciary net position is based on a long-term expected rate of return of 7.00% per annum.

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SECTION II – CERTIFICATION

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice set out by the Actuarial Standards Board as well as applicable laws and regulations. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys and our firm does not provide any legal services or advice.

This report was prepared for PERS for the purposes described herein and for the use by the plan auditor in completing an audit related to the matters herein. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.



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Principal Consulting Actuary

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SECTION III – DETERMINATION OF DISCOUNT RATE

The discount rate used to measure the Total Pension Liability was 5.66% as of June 30, 2018 and 6.28% as of June 30, 2019. As discussed with the Division of Pensions and Benefits, the projection of cash flows used to determine the discount rate as of June 30, 2019 assumed:

- In accordance with Paragraph 40 of GASB Statement No. 67, the projection of the Plan's fiduciary net position is based on a long-term expected rate of return of 7.00% per annum.
- In accordance with Paragraph 37 of GASB Statement No. 67, the projection of the Plan's contributions and projected benefit payments are based on the same assumptions used to determine the expected contributions for the System. The demographic assumptions are based on the recommendations of the July 1, 2014 – June 30, 2018 Experience Study as approved by the Board of Trustees on February 19, 2020.

Based on the State Treasurer's recommendation the following investment return assumptions are used to determine the actuarially determined contributions:

- Effective with the July 1, 2017 valuation: 7.50% per annum,
- Effective with the July 1, 2019 valuation: 7.30% per annum,
- Effective with the July 1, 2021 valuation: 7.00% per annum,
- It is assumed that the Local employers will contribute 100% of their actuarially determined contribution and 100% of their Non-Contributory Group Insurance Premium Fund (NCGIPF) contribution while the State will contribute 70% of their actuarially determined contribution and 100% of their NCGIPF contribution for all years of the projection. The 70% contribution rate is the total State contribution rate expected to be paid in fiscal year ending June 30, 2020 with respect to the actuarially determined contribution for the fiscal year ending June 30, 2020 for all State administered retirement systems.
- Consistent with Chapter 83, P.L. 2016, it is assumed that the State will make pension contributions in equal amounts at the end of each quarter.
- Annual administrative expenses are assumed to be 0.36% and 0.63% of expected pension benefit payments for State and Local employers, respectively.
- In accordance with Chapter 98, P. L. 2017, PERS receives 21.02% of the proceeds of the Lottery Enterprise for a period of 30 years. Revenues received from lottery proceeds are assumed to be contributed to the System on a monthly basis.
- It is assumed that Local employers' contributions, including the NCGIPF contributions, are expected to be received on April 1st, 21 months after the associated valuation date.
- The State NCGIPF contributions are assumed to be paid monthly.

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SECTION III – DETERMINATION OF DISCOUNT RATE

The Fiduciary Net Position (FNP) includes Local employers' contributions receivable as reported in the financial statements provided to us by the Division of Pensions and Benefits. In determining the discount rate in Appendix D, the FNP at the beginning of each year does not reflect receivable contributions as those amounts are not available at the beginning of the year to pay benefits. The receivable contributions for the current year and prior year are shown below:

- For FYE June 30, 2018, the FNP includes receivable contributions of \$1,073,054,740 (\$949,447,522 for appropriations, \$45,229,397 for NCGIPF, \$34,249,798 for Chapter 19 and \$44,128,023 for ERI).
- For FYE June 30, 2019, the FNP includes receivable contributions of \$1,038,892,124 (\$922,973,395 for appropriations, \$49,732,041 for NCGIPF, \$29,002,502 for Chapter 19 and \$37,184,186 for ERI).

Based on these assumptions, the pension Plan's fiduciary net position was projected to be available to make all projected future benefit payments of current Plan members through fiscal year 2057. Municipal bond rates of 3.87% as of June 30, 2018 and 3.50% as of June 30, 2019 were used in the development of the blended GASB discount rate after the Plan's fiduciary net position was no longer sufficient to make future benefit payments. As selected by the State Treasurer, the rates are based on the Bond Buyer GO 20-Bond Municipal Bond Index. Based on the long-term rate of return of 7.00% and the municipal bond rate of 3.87% as of June 30, 2018 and the long-term rate of return of 7.00% and the municipal bond rate of 3.50% as of June 30, 2019, the blended GASB discount rates are 5.66% as of June 30, 2018 and **6.28%** as of June 30, 2019. The assumed discount rates have been determined in accordance with the method prescribed by GASB Statement No. 67.

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SECTION IV – PROJECTION OF TOTAL PENSION LIABILITY

The Total Pension Liability (TPL) at the end of the measurement year, June 30, 2019, is measured as of a valuation date of July 1, 2018 and projected to June 30, 2019. The TPL and service cost were calculated using the Entry Age Normal Cost Method as prescribed by GASB 67. All TPL amounts shown in Tables IV-1A to IV-1C below include liabilities attributable to the NCGIPF. In addition, net employer transfer contributions and net member transfer contributions with accumulated interest are added to the June 30, 2019 TPL.

During the measurement year there was a change in assumptions. There were no other significant events during the projection period of which we are aware. Because the TPL shown in the prior report was measured as of July 1, 2017 and projected to June 30, 2018, it will not match the amounts measured as of July 1, 2018 that are shown in this exhibit.

The following tables show the projection of the TPL, broken out by State, Local employers and in Total for the System, and at discount rates equal to the rate used for disclosure and plus and minus one percent from the rate used for disclosure.

Table IV-1A			
Projection of Total Pension Liability from Valuation to Measurement Date			
State			
Discount Rate	5.28%	6.28%	7.28%
Total Pension Liability, 7/1/2018			
Actives	\$ 13,949,570,520	\$ 12,012,021,777	\$ 10,415,108,649
Deferred Vested	28,346,893	24,831,602	21,948,027
Retirees	<u>18,501,505,867</u>	<u>16,998,509,600</u>	<u>15,706,900,692</u>
Total	\$ 32,479,423,280	\$ 29,035,362,979	\$ 26,143,957,368
Service Cost	603,879,478	486,265,506	397,874,362
Benefit Payments	(1,806,861,504)	(1,806,861,504)	(1,806,861,504)
Transfer Contributions - Employer	(610,050)	(610,050)	(610,050)
Transfer Contributions - Member	525,298	525,298	525,298
Interest	<u>1,699,708,594</u>	<u>1,798,084,026</u>	<u>1,867,627,886</u>
Total Pension Liability, 6/30/2019	\$ 32,976,065,096	\$ 29,512,766,255	\$ 26,602,513,360

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SECTION IV – PROJECTION OF TOTAL PENSION LIABILITY

Table IV-1B			
Projection of Total Pension Liability from Valuation to Measurement Date			
Local Employers			
Discount Rate	5.28%	6.28%	7.28%
Total Pension Liability, 7/1/2018			
Actives	\$ 21,302,650,865	\$ 18,454,554,213	\$ 16,094,526,537
Deferred Vested	51,064,839	44,913,645	39,847,340
Retirees	<u>23,899,701,532</u>	<u>22,013,954,957</u>	<u>20,388,350,329</u>
Total	\$ 45,253,417,236	\$ 40,513,422,815	\$ 36,522,724,206
Service Cost	956,849,734	780,036,005	645,904,374
Benefit Payments	(2,311,509,918)	(2,311,509,918)	(2,311,509,918)
Transfer Contributions - Employer	(2,266,863)	(2,266,863)	(2,266,863)
Transfer Contributions - Member	(9,603,979)	(9,603,979)	(9,603,979)
Interest	<u>2,379,353,801</u>	<u>2,521,385,826</u>	<u>2,622,790,694</u>
Total Pension Liability, 6/30/2019	\$ 46,266,240,011	\$ 41,491,463,886	\$ 37,468,038,514

Table IV-1C			
Projection of Total Pension Liability from Valuation to Measurement Date			
Total			
Discount Rate	5.28%	6.28%	7.28%
Total Pension Liability, 7/1/2018			
Actives	\$ 35,252,221,385	\$ 30,466,575,990	\$ 26,509,635,186
Deferred Vested	79,411,732	69,745,247	61,795,367
Retirees	<u>42,401,207,399</u>	<u>39,012,464,557</u>	<u>36,095,251,021</u>
Total	\$ 77,732,840,516	\$ 69,548,785,794	\$ 62,666,681,574
Service Cost	1,560,729,212	1,266,301,511	1,043,778,736
Benefit Payments	(4,118,371,422)	(4,118,371,422)	(4,118,371,422)
Transfer Contributions - Employer	(2,876,913)	(2,876,913)	(2,876,913)
Transfer Contributions - Member	(9,078,681)	(9,078,681)	(9,078,681)
Interest	<u>4,079,062,395</u>	<u>4,319,469,852</u>	<u>4,490,418,580</u>
Total Pension Liability, 6/30/2019	\$ 79,242,305,107	\$ 71,004,230,141	\$ 64,070,551,874

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SECTION V – NOTE DISCLOSURES

The following tables show the changes in the Total Pension Liability, the Plan Fiduciary Net Position (i.e., fair value of System assets), and the Net Pension Liability during the Measurement Year. There were changes in assumptions including the assumed rates of termination, retirement, mortality, disability, salary increases, and inflation as a result of the July 1, 2014 – June 30, 2018 Experience Study. The mortality rates used for the TPL were based on the MP-2019 mortality improvement scale as directed by the DPB. In addition, the discount rate was increased from 5.66% as of June 30, 2018 to 6.28% as of June 30, 2019 in accordance with the method prescribed by GASB Statement No. 67. The impact of these changes is displayed below.

Table V-1A Change in Net Pension Liability State			
	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 6/30/2018	\$ 30,434,600,657	\$ 6,730,302,564	\$ 23,704,298,093
Changes for the year:			
Service cost	526,757,589		526,757,589
Interest	1,701,980,100		1,701,980,100
Changes of benefits	0		0
Differences between expected and actual experience	(12,049,899)		(12,049,899)
Changes of assumptions	(1,331,575,936)		(1,331,575,936)
Contributions - employer (appropriations)		621,170,866	(621,170,866)
Contributions - employer (NCGI)		36,559,347	(36,559,347)
Contributions - employer (lottery)		232,271,000	(232,271,000)
Contributions - member		355,581,371	(355,581,371)
Transfers from other systems - employer	(610,050)	(610,050)	0
Transfers from other systems - member	525,298	525,298	0
Employer contribution - delayed enrollment	0	194,089	(194,089)
Employer contribution - delayed appropriations	0	43,788	(43,788)
Employer contribution - retroactive	0	0	0
Employer contribution - additional	0	0	0
Other - NCGIPF adjustment	0	0	0
Net investment income		337,762,489	(337,762,489)
Benefit payments	(1,806,861,504)	(1,806,861,504)	0
Administrative expense		(6,593,343)	6,593,343
Net changes	<u>(921,834,402)</u>	<u>(229,956,649)</u>	<u>(691,877,753)</u>
Balances at 6/30/2019	<u>\$ 29,512,766,255</u>	<u>\$ 6,500,345,915</u>	<u>\$ 23,012,420,340</u>

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SECTION V – NOTE DISCLOSURES

Table V-1B Change in Net Pension Liability Local Employers			
	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 6/30/2018	\$ 42,431,573,511	\$ 22,742,071,972	\$ 19,689,501,539
Changes for the year:			
Service cost	803,761,000		803,761,000
Interest	2,382,273,210		2,382,273,210
Changes of benefits	0		0
Differences between expected and actual experience	149,209,849		149,209,849
Changes of assumptions	(1,951,972,924)		(1,951,972,924)
Contributions - employer (appropriations)		922,973,395	(922,973,395)
Contributions - employer (NCGI)		49,732,041	(49,732,041)
Contributions - employer (paid by State on behalf of locals)		6,829,134	(6,829,134)
Contributions - member		553,610,183	(553,610,183)
Transfers from other systems - employer	(2,266,863)	(2,266,863)	0
Transfers from other systems - member	(9,603,979)	(9,603,979)	0
Employer contribution - delayed enrollment	0	463,612	(463,612)
Employer contribution - delayed appropriations	0	1,732,038	(1,732,038)
Employer contribution - retroactive	0	4,623,577	(4,623,577)
Employer contribution - additional	0	103,872	(103,872)
Other - NCGIPF adjustment	0	2,387	(2,387)
Net investment income		1,403,534,398	(1,403,534,398)
Benefit payments	(2,311,509,918)	(2,311,509,918)	0
Administrative expense		(14,664,098)	14,664,098
Net changes	(940,109,625)	605,559,779	(1,545,669,404)
Balances at 6/30/2019	\$ 41,491,463,886	\$ 23,347,631,751	\$ 18,143,832,135

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SECTION V – NOTE DISCLOSURES

Table V-1C Change in Net Pension Liability Total			
	Increase (Decrease)		
	Total Pension Liability (a)	Plan Fiduciary Net Position (b)	Net Pension Liability (a) - (b)
Balances at 6/30/2018	\$ 72,866,174,168	\$ 29,472,374,536	\$ 43,393,799,632
Changes for the year:			
Service cost	1,330,518,589		1,330,518,589
Interest	4,084,253,310		4,084,253,310
Changes of benefits	0		0
Differences between expected and actual experience	137,159,950		137,159,950
Changes of assumptions	(3,283,548,860)		(3,283,548,860)
Contributions - employer (appropriations)		1,544,144,261	(1,544,144,261)
Contributions - employer (NCGI)		86,291,388	(86,291,388)
Contributions - employer (lottery)		232,271,000	(232,271,000)
Contributions - employer (paid by State on behalf of locals)		6,829,134	(6,829,134)
Contributions - member		909,191,554	(909,191,554)
Transfers from other systems - employer	(2,876,913)	(2,876,913)	0
Transfers from other systems - member	(9,078,681)	(9,078,681)	0
Employer contribution - delayed enrollment	0	657,701	(657,701)
Employer contribution - delayed appropriations	0	1,775,826	(1,775,826)
Employer contribution - retroactive	0	4,623,577	(4,623,577)
Employer contribution - additional	0	103,872	(103,872)
Other - NCGIPF adjustment	0	2,387	(2,387)
Net investment income		1,741,296,887	(1,741,296,887)
Benefit payments	(4,118,371,422)	(4,118,371,422)	0
Administrative expense		(21,257,441)	21,257,441
Net changes	(1,861,944,027)	375,603,130	(2,237,547,157)
Balances at 6/30/2019	\$ 71,004,230,141	\$ 29,847,977,666	\$ 41,156,252,475

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SECTION V – NOTE DISCLOSURES

Changes in the discount rate affect the measurement of the TPL. Lower discount rates produce a higher TPL and higher discount rates produce a lower TPL. Because the discount rate does not affect the measurement of assets, the percentage change in the NPL can be very significant for a relatively small change in the discount rate. The following table shows the sensitivity of the NPL to the discount rate.

Table V-2 Sensitivity of Net Pension Liability to Changes in Discount Rate			
	1% Decrease 5.28%	Discount Rate 6.28%	1% Increase 7.28%
<u>State</u>			
Total Pension Liability	\$ 32,976,065,096	\$ 29,512,766,255	\$ 26,602,513,360
Plan Fiduciary Net Position	<u>6,500,345,915</u>	<u>6,500,345,915</u>	<u>6,500,345,915</u>
Net Pension Liability	<u>\$ 26,475,719,181</u>	<u>\$ 23,012,420,340</u>	<u>\$ 20,102,167,445</u>
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	19.7%	22.0%	24.4%
<u>Local Employers</u>			
Total Pension Liability	\$ 46,266,240,011	\$ 41,491,463,886	\$ 37,468,038,514
Plan Fiduciary Net Position	<u>23,347,631,751</u>	<u>23,347,631,751</u>	<u>23,347,631,751</u>
Net Pension Liability	<u>\$ 22,918,608,260</u>	<u>\$ 18,143,832,135</u>	<u>\$ 14,120,406,763</u>
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	50.5%	56.3%	62.3%
<u>Total</u>			
Total Pension Liability	\$ 79,242,305,107	\$ 71,004,230,141	\$ 64,070,551,874
Plan Fiduciary Net Position	<u>29,847,977,666</u>	<u>29,847,977,666</u>	<u>29,847,977,666</u>
Net Pension Liability	<u>\$ 49,394,327,441</u>	<u>\$ 41,156,252,475</u>	<u>\$ 34,222,574,208</u>
Plan Fiduciary Net Position as a Percentage of the Total Pension Liability	37.7%	42.0%	46.6%

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SECTION VI – REQUIRED SUPPLEMENTARY INFORMATION

The schedules below show the changes in NPL and related ratios required by GASB for the current and prior year.

Table VI-1A		
Schedule of Changes in Net Pension Liability and Related Ratios		
State		
	FYE 2019	FYE 2018
<u>Total Pension Liability</u>		
Service cost	\$ 526,757,589	\$ 626,034,754
Interest (includes interest on service cost)	1,701,980,100	1,615,364,543
Changes of benefit terms	0	0
Differences between expected and actual experience	(12,049,899)	(240,455,030)
Changes of assumptions	(1,331,575,936)	(2,371,853,533)
Transfers from other systems - employer	(610,050)	(486,062)
Transfers from other systems - member	525,298	(1,425,006)
Benefit payments, including refunds of member contributions	<u>(1,806,861,504)</u>	<u>(1,728,475,861)</u>
Net change in total pension liability	\$ (921,834,402)	\$ (2,101,296,195)
Total pension liability - beginning	<u>30,434,600,657</u>	<u>32,535,896,852</u>
Total pension liability - ending	<u>\$ 29,512,766,255</u>	<u>\$ 30,434,600,657</u>
<u>Plan fiduciary net position</u>		
Contributions - employer (appropriations)	\$ 621,170,866	\$ 452,380,229
Contributions - employer (NCGI)	36,559,347	28,418,599
Contributions - employer (lottery)	232,271,000	205,155,662
Contributions - member	355,581,371	320,487,632
Transfers from other systems - employer	(610,050)	(486,062)
Transfers from other systems - member	525,298	(1,425,006)
Employer contribution - delayed enrollment	194,089	205,300
Employer contribution - delayed appropriations	43,788	44,183
Employer contribution - retroactive	0	0
Employer contribution - additional	0	0
Other - NCGIPF adjustment	0	0
Net investment income	337,762,489	570,308,126
Benefit payments, including refunds of member contributions	(1,806,861,504)	(1,728,475,861)
Administrative expense	<u>(6,593,343)</u>	<u>(6,584,293)</u>
Net change in plan fiduciary net position	\$ (229,956,649)	\$ (159,971,491)
Plan fiduciary net position - beginning	<u>6,730,302,564</u>	<u>6,890,274,055</u>
Plan fiduciary net position - ending	<u>\$ 6,500,345,915</u>	<u>\$ 6,730,302,564</u>
Net pension liability - ending	<u>\$ 23,012,420,340</u>	<u>\$ 23,704,298,093</u>
Plan fiduciary net position as a percentage of the total pension liability	22.03%	22.11%
Covered payroll	\$ 4,333,772,974	\$ 4,338,076,575
Net pension liability as a percentage of covered payroll	531.00%	546.42%

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SECTION VI – REQUIRED SUPPLEMENTARY INFORMATION

Table VI-1B		
Schedule of Changes in Net Pension Liability and Related Ratios		
Local Employers		
	FYE 2019	FYE 2018
<u>Total Pension Liability</u>		
Service cost	\$ 803,761,000	\$ 929,389,291
Interest (includes interest on service cost)	2,382,273,210	2,234,285,722
Changes of benefit terms	0	0
Differences between expected and actual experience	149,209,849	(123,453,186)
Changes of assumptions	(1,951,972,924)	(3,241,864,721)
Transfers from other systems - employer	(2,266,863)	(2,111,973)
Transfers from other systems - member	(9,603,979)	(9,193,959)
Benefit payments, including refunds of member contributions	(2,311,509,918)	(2,207,844,714)
Net change in total pension liability	\$ (940,109,625)	\$ (2,420,793,540)
Total pension liability - beginning	42,431,573,511	44,852,367,051
Total pension liability - ending	\$ 41,491,463,886	\$ 42,431,573,511
<u>Plan fiduciary net position</u>		
Contributions - employer (appropriations)	\$ 922,973,395	\$ 949,447,522
Contributions - employer (NCGI)	49,732,041	45,229,397
Contributions - employer (paid by State on behalf of locals)	6,829,134	0
Contributions - member	553,610,183	533,691,158
Transfers from other systems - employer	(2,266,863)	(2,111,973)
Transfers from other systems - member	(9,603,979)	(9,193,959)
Employer contribution - delayed enrollment	463,612	726,311
Employer contribution - delayed appropriations	1,732,038	2,643,784
Employer contribution - retroactive	4,623,577	4,818,841
Employer contribution - additional	103,872	28,566
Other - NCGIPF adjustment	2,387	0
Net investment income	1,403,534,398	1,865,455,433
Benefit payments, including refunds of member contributions	(2,311,509,918)	(2,207,844,714)
Administrative expense	(14,664,098)	(14,783,857)
Net change in plan fiduciary net position	\$ 605,559,779	\$ 1,168,106,509
Plan fiduciary net position - beginning	22,742,071,972	21,573,965,463
Plan fiduciary net position - ending	\$ 23,347,631,751	\$ 22,742,071,972
Net pension liability - ending	\$ 18,143,832,135	\$ 19,689,501,539
Plan fiduciary net position as a percentage of the total pension liability	56.27%	53.60%
Covered payroll	\$ 7,106,248,788	\$ 7,022,568,096
Net pension liability as a percentage of covered payroll	255.32%	280.37%

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SECTION VI – REQUIRED SUPPLEMENTARY INFORMATION

Table VI-1C Schedule of Changes in Net Pension Liability and Related Ratios Total		
	FYE 2019	FYE 2018
<u>Total Pension Liability</u>		
Service cost	\$ 1,330,518,589	\$ 1,555,424,045
Interest (includes interest on service cost)	4,084,253,310	3,849,650,265
Changes of benefit terms	0	0
Differences between expected and actual experience	137,159,950	(363,908,216)
Changes of assumptions	(3,283,548,860)	(5,613,718,254)
Transfers from other systems - employer	(2,876,913)	(2,598,035)
Transfers from other systems - member	(9,078,681)	(10,618,965)
Benefit payments, including refunds of member contributions	(4,118,371,422)	(3,936,320,575)
Net change in total pension liability	\$ (1,861,944,027)	\$ (4,522,089,735)
Total pension liability - beginning	72,866,174,168	77,388,263,903
Total pension liability - ending	\$ 71,004,230,141	\$ 72,866,174,168
<u>Plan fiduciary net position</u>		
Contributions - employer (appropriations)	\$ 1,544,144,261	\$ 1,401,827,751
Contributions - employer (NCGI)	86,291,388	73,647,996
Contributions - employer (lottery)	232,271,000	205,155,662
Contributions - employer (paid by State on behalf of locals)	6,829,134	0
Contributions - member	909,191,554	854,178,790
Transfers from other systems - employer	(2,876,913)	(2,598,035)
Transfers from other systems - member	(9,078,681)	(10,618,965)
Employer contribution - delayed enrollment	657,701	931,611
Employer contribution - delayed appropriations	1,775,826	2,687,967
Employer contribution - retroactive	4,623,577	4,818,841
Employer contribution - additional	103,872	28,566
Other - NCGIPF adjustment	2,387	0
Net investment income	1,741,296,887	2,435,763,559
Benefit payments, including refunds of member contributions	(4,118,371,422)	(3,936,320,575)
Administrative expense	(21,257,441)	(21,368,150)
Net change in plan fiduciary net position	\$ 375,603,130	\$ 1,008,135,018
Plan fiduciary net position - beginning	29,472,374,536	28,464,239,518
Plan fiduciary net position - ending	\$ 29,847,977,666	\$ 29,472,374,536
Net pension liability - ending	\$ 41,156,252,475	\$ 43,393,799,632
Plan fiduciary net position as a percentage of the total pension liability	42.04%	40.45%
Covered payroll	\$ 11,440,021,762	\$ 11,360,644,671
Net pension liability as a percentage of covered payroll	359.76%	381.97%

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SECTION VI – REQUIRED SUPPLEMENTARY INFORMATION

If an Actuarially Determined Contribution (ADC) is calculated, the following schedule is required. An ADC is a contribution amount determined in accordance with Actuarial Standards of Practice. Amounts shown for the ADC and actual contributions in the table below include the Non-Contributory Group Insurance Premium Fund costs.

Table VI-2 Schedule of Employer Contributions		
	FYE 2019	FYE 2018
<u>State</u>		
Actuarially Determined Contribution	\$ 1,442,424,952	\$ 1,359,355,058
Contributions in Relation to the Actuarially Determined Contribution	<u>896,830,347</u>	<u>685,954,490</u>
Contribution Deficiency/(Excess)	<u>\$ 545,594,605</u>	<u>\$ 673,400,568</u>
Covered Payroll	\$ 4,333,772,974	\$ 4,338,076,575
Contributions as a Percentage of Covered Payroll	20.69%	15.81%
<u>Local Employers</u>		
Actuarially Determined Contribution	\$ 1,015,348,667	\$ 946,932,034
Contributions in Relation to the Actuarially Determined Contribution	<u>1,015,379,570</u>	<u>947,016,582</u>
Contribution Deficiency/(Excess)	<u>\$ (30,903)</u>	<u>\$ (84,548)</u>
Covered Payroll	\$ 7,106,248,788	\$ 7,022,568,096
Contributions as a Percentage of Covered Payroll	14.29%	13.49%
<u>System Total</u>		
Actuarially Determined Contribution	\$ 2,457,773,619	\$ 2,306,287,092
Contributions in Relation to the Actuarially Determined Contribution	<u>1,912,209,917</u>	<u>1,632,971,072</u>
Contribution Deficiency/(Excess)	<u>\$ 545,563,702</u>	<u>\$ 673,316,020</u>
Covered Payroll	\$ 11,440,021,762	\$ 11,360,644,671
Contributions as a Percentage of Covered Payroll	16.72%	14.37%

* Includes NCGIPF

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SECTION VI – REQUIRED SUPPLEMENTARY INFORMATION

The following summarizes key methods and assumptions used to determine the Actuarially Determined Contribution for FYE 2019.

Valuation Date:	July 1, 2017
Timing:	Actuarial determined contributions are calculated as of the July 1 preceding the fiscal year in which contributions are made.
Actuarial cost method:	Projected Unit Credit
Amortization method:	Level dollar
Remaining amortization period:	Open 30-year period
Asset valuation method:	5-year smoothing of difference between market value and expected actuarial value
Investment rate of return:	7.50%
Salary increases:	Age-based rates scaling from 4.15% at age 20 to 1.65% at age 69 through period ending June 30, 2026; Age-based rates scaling from 5.15% at age 20 to 2.65% at age 69 following June 30, 2026
Mortality:	<i>Pre-Retirement:</i> RP-2000 Employee Mortality Tables. For State, the tables are set back four years for males and females. For Local employers, the tables are set back two years for males and seven years for females. The tables are projected on a generational basis from the base year of 2013 using the Conduent Modified 2014 Projection Scale. <i>Post-Retirement Healthy Lives:</i> RP-2000 Combined Healthy Mortality Tables, set back one year for males and females, projected on a generational basis using Projection Scale AA from the base year of 2012 to 2013 and the Conduent Modified 2014 Projection Scale thereafter. <i>Disabled Retirees:</i> RP-2000 Disabled Mortality Tables, set back three years for males and set forward one year for females.

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APPENDIX A – MEMBERSHIP INFORMATION

	Plan Membership					
	July 1, 2018			July 1, 2017		
	State	Local Employers	Total	State	Local	Total
Contributing Actives	68,593	146,615	215,208	68,578	148,757	217,335
Non-Contributing Actives	9,405	27,985	37,390	9,260	28,185	37,445
Terminated Vested	169	440	609	176	413	589
Inactive Receiving Benefits*	58,556	120,192	178,748	57,262	117,642	174,904
Total	136,723	295,232	431,955	135,276	294,997	430,273
Annual Compensation for Contributing Actives	\$ 4,333,772,974	\$ 7,106,248,788	\$ 11,440,021,762	\$ 4,338,076,575	\$ 7,022,568,096	\$ 11,360,644,671
Annual Retirement Allowances for Those Receiving Benefits	\$ 1,607,733,796	\$ 2,157,906,233	\$ 3,765,640,029	\$ 1,542,787,197	\$ 2,069,390,586	\$ 3,612,177,783

* QDRO recipients are excluded from the counts for both years.

The July 1, 2017 membership information shown in the table above is based on Cheiron's processed data and may not match the prior actuary's report. The headcounts reflect all records for multiple members. Active records represent 253,092 distinct members, including 215,694 contributing members, and inactive records represent 174,457 distinct members.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. **Investment Rate of Return for determining Actuarially Determined Contributions**
 - July 1, 2018 valuation: 7.50% per annum, compounded annually.
 - July 1, 2019 valuation: 7.30% per annum, compounded annually.
 - July 1, 2020 valuation: 7.30% per annum, compounded annually.
 - July 1, 2021 and later valuations: 7.00% per annum, compounded annually.

2. **Long-Term Expected Rate of Return** 7.00% per annum, compounded annually.

3. **Interest Crediting Rate on Accumulated Deductions** 7.50% per annum, compounded annually.

4. **GASB 67 Effective Discount Rate**
 - June 30, 2018: 5.66% per annum, compounded annually.
 - June 30, 2019: 6.28% per annum, compounded annually.

5. **Price Inflation** • 2.75% per annum, compounded annually.

6. **Wage Inflation** • 3.25% per annum, compounded annually.

7. **Cost-of-Living Adjustments (COLAs)** No future COLAs are assumed. Previously granted COLAs are included in the data.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

8. Salary Increases

Salary increases vary by years of service and time period. Annual salary increases are shown below.

Salary Increases		
Years of Service	Period Ending June 30, 2026	Ultimate Period
0	6.00%	7.00%
1	6.00	7.00
2	5.75	6.75
3	5.50	6.50
4	5.00	6.00
5	4.75	5.75
6	4.50	5.50
7	4.25	5.25
8	4.00	5.00
9	3.80	4.80
10	3.60	4.60
11	3.40	4.40
12	3.20	4.20
13	3.00	4.00
14	2.90	3.90
15	2.80	3.80
16	2.70	3.70
17-21	2.60	3.60
22	2.50	3.50
23-25	2.40	3.40
26	2.30	3.30
27	2.20	3.20
28	2.10	3.10
29+	2.00	3.00

Salary increases are assumed to occur on July 1.

9. 401(a)(17) Pay Limit

\$275,000 in 2018 increasing 2.75% per annum, compounded annually.

10. Social Security Wage Base

\$128,400 in 2018 increasing 3.25% per annum, compounded annually.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

11. Termination

Termination rates for members electing a refund of contributions are as follows:

Termination Rates for Members Electing a Refund				
Service	State		Local Employers'	
	Less than 31 Years Old	31 Years or Older	Less than 31 Years Old	31 Years or Older
0	23.00%	11.00%	21.00%	12.00%
1	23.00	11.00	21.00	12.00
2	12.00	8.00	16.00	9.00
3	11.00	7.00	15.00	8.00
4	10.50	6.00	13.00	7.00
5	10.00	6.00	12.00	7.00
6	7.50	6.00	10.00	6.50
7	7.50	5.00	9.00	5.50
8	7.50	4.50	9.00	5.00
9	7.50	3.50	6.50	4.00
10	1.70	1.70	1.70	1.70
11	1.50	1.50	1.50	1.50
12	1.10	1.10	1.40	1.40
13	1.10	1.10	1.20	1.20
14	0.70	0.70	1.10	1.10
15	0.60	0.60	0.90	0.90
16	0.60	0.60	0.80	0.80
17	0.60	0.60	0.70	0.70
18	0.50	0.50	0.60	0.60
19	0.50	0.50	0.60	0.60
20	0.50	0.50	0.50	0.50
21	0.50	0.50	0.50	0.50
22	0.40	0.40	0.50	0.50
23	0.40	0.40	0.40	0.40
24-29	0.30	0.30	0.30	0.30

No termination is assumed after attainment of retirement eligibility.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Termination rates for members electing a deferred annuity are as follows:

Termination Rates for Members Electing a Deferred Annuity		
Service	State	Local Employers
< 10	N/A	N/A
10	1.60%	1.80%
11	1.60	1.80
12	1.20	1.70
13	1.20	1.60
14	1.00	1.50
15	0.90	1.40
16	0.90	1.30
17	0.80	1.20
18	0.80	1.10
19	0.80	1.00
20	0.80	1.00
21	0.70	0.90
22	0.50	0.80
23	0.50	0.80
24	0.40	0.70

No termination is assumed after attainment of retirement eligibility.

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

12. Disability

Ordinary disability rates are as follows:

Ordinary Disability Rates					
Age	State	Local Employers	Age	State	Local Employers
25	0.100%	0.200%	50	0.380%	0.390%
26	0.110	0.200	51	0.395	0.405
27	0.120	0.200	52	0.410	0.420
28	0.130	0.200	53	0.425	0.435
29	0.140	0.200	54	0.440	0.450
30	0.150	0.205	55	0.455	0.460
31	0.160	0.210	56	0.470	0.470
32	0.170	0.215	57	0.485	0.480
33	0.180	0.220	58	0.500	0.490
34	0.190	0.225	59	0.515	0.500
35	0.205	0.230	60	0.530	0.510
36	0.220	0.235	61	0.545	0.520
37	0.235	0.240	62	0.560	0.530
38	0.250	0.245	63	0.575	0.540
39	0.265	0.250	64	0.590	0.550
40	0.275	0.260	65	0.605	0.560
41	0.285	0.270	66	0.620	0.570
42	0.295	0.280	67	0.635	0.580
43	0.305	0.290	68	0.650	0.590
44	0.315	0.300	69	0.665	0.600
45	0.325	0.315	70	0.675	0.615
46	0.335	0.330	71	0.685	0.630
47	0.345	0.345	72	0.695	0.645
48	0.355	0.360	73	0.705	0.660
49	0.365	0.375	74	0.715	0.675

Accidental disability rates are assumed to be 0.02% for all State members and 0.03% for all Local employers' members.

Ordinary disability rates apply upon attainment of 10 years of service and continue through the ultimate retirement age.

Members are assumed to receive the greater of the applicable disability benefit or the early or service retirement benefit, depending on eligibility.

Tier 4 and Tier 5 members are not eligible for the Ordinary or Accidental Disability benefits but the disability rates still apply. Such members terminating under the disability decrement are assumed to separate from service and elect a Deferred Retirement benefit.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

13. Mortality

Pre-Retirement Mortality: The Pub-2010 General Below-Median Income Employee mortality table [*PubG-2010(B) Employee*] as published by the Society of Actuaries with an 82.2% adjustment for males and 101.4% adjustment for females, and with future improvement from the base year of 2010 on a generational basis. For purposes of calculating projected cash flows used to determine the GASB discount rate, mortality improvement is based on SOA's Scale MP-2018. Upon direction from the DPB, for purposes of calculating the Total Pension Liability, mortality improvement is based on SOA's Scale MP-2019.

All pre-retirement deaths are assumed to be ordinary deaths.

Healthy Retirees and Beneficiaries (Healthy Annuitants): The Pub-2010 General Below-Median Income Healthy Retiree mortality table [*PubG-2010(B) Healthy Retiree*] as published by the Society of Actuaries with a 91.4% adjustment for males and 99.7% adjustment for females, and with future improvement from the base year of 2010 on a generational basis. For purposes of calculating projected cash flows used to determine the GASB discount rate, mortality improvement is based on SOA's Scale MP-2018. Upon direction from the DPB, for purposes of calculating the Total Pension Liability, mortality improvement is based on SOA's Scale MP-2019.

Disabled Retirees (Disabled Annuitants): The Pub-2010 Non-Safety Disabled Retiree mortality table [*PubNS-2010 Disabled Retiree*] as published by the Society of Actuaries with a 127.7% adjustment for males and 117.2% adjustment for females, and with future improvement from the base year of 2010 on a generational basis. For purposes of calculating projected cash flows used to determine the GASB discount rate, mortality improvement is based on SOA's Scale MP-2018. Upon direction from the DPB, for purposes of calculating the Total Pension Liability, mortality improvement is based on SOA's Scale MP-2019.

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14. Retirement

Retirement rates for State Tier 1-4 members are as follows:

State Tiers 1-4 Retirement Rates			
Age	Less Than 25 Years of Service	25 Years of Service	26 or More Years of Service
< 49	N/A	3.50%	2.00%
49	N/A	3.50	2.00
50	N/A	3.50	3.50
51	N/A	3.50	3.50
52	N/A	6.00	4.25
53	N/A	6.00	5.50
54	N/A	7.00	6.75
55	N/A	17.50	18.00
56	N/A	17.50	15.00
57	N/A	17.50	14.00
58	N/A	20.00	14.00
59	N/A	20.00	14.00
60	5.00	20.00	17.00
61	5.00	30.00	17.00
62	8.00	36.50	27.00
63	8.00	36.50	24.00
64	8.00	36.50	21.00
65	12.00	44.00	25.00
66	17.00	55.00	30.00
67	16.00	50.00	26.00
68	15.00	47.00	23.00
69	15.00	47.00	23.00
70	15.00	47.00	26.00
71	15.00	47.00	23.00
72	15.00	47.00	21.00
73	15.00	47.00	21.00
74	15.00	47.00	21.00
75	100.00	100.00	100.00

Rates apply upon retirement eligibility by tier.

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Retirement rates for Local employers' Tier 1-4 members are as follows:

Local Employers' Tiers 1-4 Retirement Rates			
Age	Less Than 25 Years of Service	25 Years of Service	26 or More Years of Service
< 49	N/A	3.00%	2.25%
49	N/A	3.00	3.00
50	N/A	3.50	3.50
51	N/A	4.25	3.75
52	N/A	4.75	3.75
53	N/A	7.00	5.00
54	N/A	7.00	6.00
55	N/A	15.00	15.00
56	N/A	17.00	13.00
57	N/A	18.00	12.00
58	N/A	18.00	12.00
59	N/A	18.00	12.00
60	4.50	18.00	14.00
61	4.50	18.00	14.00
62	7.50	34.00	25.00
63	7.50	34.00	22.00
64	7.50	34.00	20.00
65	11.00	35.00	20.00
66	15.00	43.00	26.00
67	14.00	40.00	26.00
68	13.00	40.00	22.00
69	13.00	37.00	22.00
70	13.00	37.00	24.00
71	13.00	37.00	24.00
72	13.00	37.00	20.00
73	13.00	37.00	20.00
74	13.00	37.00	20.00
75	100.00	100.00	100.00

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Retirement rates for State Tier 5 members are as follows:

State Tier 5 Retirement Rates					
Age	Less Than 25 Years of Service	25 Years of Service	26 to 29 Years of Service	30 Years of Service	31 or More Years of Service
< 49	N/A	N/A	N/A	3.50%	2.00%
49	N/A	N/A	N/A	3.50	2.00
50	N/A	N/A	N/A	3.50	3.50
51	N/A	N/A	N/A	3.50	3.50
52	N/A	N/A	N/A	6.00	4.25
53	N/A	N/A	N/A	6.00	5.50
54	N/A	N/A	N/A	7.00	6.75
55	N/A	N/A	N/A	17.50	18.00
56	N/A	N/A	N/A	17.50	15.00
57	N/A	N/A	N/A	17.50	14.00
58	N/A	N/A	N/A	20.00	14.00
59	N/A	N/A	N/A	20.00	14.00
60	N/A	N/A	N/A	20.00	17.00
61	N/A	N/A	N/A	30.00	17.00
62	N/A	N/A	N/A	36.50	27.00
63	N/A	N/A	N/A	36.50	24.00
64	N/A	N/A	N/A	36.50	21.00
65	12.00	44.00	44.00	44.00	25.00
66	17.00	55.00	30.00	30.00	30.00
67	16.00	50.00	26.00	26.00	26.00
68	15.00	47.00	23.00	23.00	23.00
69	15.00	47.00	23.00	23.00	23.00
70	15.00	47.00	26.00	26.00	26.00
71	15.00	47.00	23.00	23.00	23.00
72	15.00	47.00	21.00	21.00	21.00
73	15.00	47.00	21.00	21.00	21.00
74	15.00	47.00	21.00	21.00	21.00
75	100.00	100.00	100.00	100.00	100.00

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APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

Retirement rates for Local employers' Tier 5 members are as follows:

Local Employers' Tier 5 Retirement Rates					
Age	Less Than 25 Years of Service	25 Years of Service	26 to 29 Years of Service	30 Years of Service	31 or More Years of Service
< 49	N/A	N/A	N/A	3.00%	2.25%
49	N/A	N/A	N/A	3.00	3.00
50	N/A	N/A	N/A	3.50	3.50
51	N/A	N/A	N/A	4.25	3.75
52	N/A	N/A	N/A	4.75	3.75
53	N/A	N/A	N/A	7.00	5.00
54	N/A	N/A	N/A	7.00	6.00
55	N/A	N/A	N/A	15.00	15.00
56	N/A	N/A	N/A	17.00	13.00
57	N/A	N/A	N/A	18.00	12.00
58	N/A	N/A	N/A	18.00	12.00
59	N/A	N/A	N/A	18.00	12.00
60	N/A	N/A	N/A	18.00	14.00
61	N/A	N/A	N/A	18.00	14.00
62	N/A	N/A	N/A	34.00	25.00
63	N/A	N/A	N/A	34.00	22.00
64	N/A	N/A	N/A	34.00	20.00
65	11.00	35.00	35.00	35.00	20.00
66	15.00	43.00	26.00	26.00	26.00
67	14.00	40.00	26.00	26.00	26.00
68	13.00	40.00	22.00	22.00	22.00
69	13.00	37.00	22.00	22.00	22.00
70	13.00	37.00	24.00	24.00	24.00
71	13.00	37.00	24.00	24.00	24.00
72	13.00	37.00	20.00	20.00	20.00
73	13.00	37.00	20.00	20.00	20.00
74	13.00	37.00	20.00	20.00	20.00
75	100.00	100.00	100.00	100.00	100.00

Retirement rates for members of Prosecutors Part (Chapter 366, P.L. 2001) are as follows:

- Members with less than 25 years of service: 6.0% for all ages,
- Members with 25 years of service: 50.0% for all ages,
- Members with 26 or more years of service: 25.0% for all ages.

Rates apply upon retirement eligibility. 100% retirement is assumed at age 70.

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- 15. Family Composition Assumptions** For members not currently in receipt, 100% of members are assumed married to spouses of the opposite sex. Males are assumed to be three years older than females.
- For purposes of the optional form of payment death benefit for members currently in receipt, beneficiary status is based on the beneficiary allowance reported. If no beneficiary date of birth is provided, the beneficiary is assumed to be the member's spouse of the opposite sex with males assumed to be three years older than females.
- No additional dependent children or parents are assumed.
- 16. Form of Payment** Current active members are assumed to elect the Maximum Option.
- 17. Non-Contributory Group Insurance Form of Payment** All benefits are assumed to be paid as lump sums.
- 18. Data** All non-contributing members are included in the valuation with a liability based on the reported ASF.
- Per discussions with DPB, the statuses for active records in Locations 4 – 7 (General Assembly and Senate) are based on changes in service instead of the contribution code.
- For current beneficiaries with incomplete information, reasonable assumptions were made based on information available in prior years.
- Inactive participants receiving benefits according to the 2017 data but omitted from the 2018 data are assumed to have died without a beneficiary.
- 19. Rationale for Assumptions** The demographic assumptions used in this report reflect the results of the July 1, 2014 – June 30, 2018 Experience Study approved by the Board of Trustees on February 19, 2020. The investment return assumption was recommended by the State Treasurer. The MP-2019 mortality improvement scale was used to calculate the Total Pension Liability upon direction from the DPB.
- 20. Changes in Assumptions Since Last Valuation** The assumed rates of termination, retirement, mortality, disability, salary increases, and inflation were updated based on the July 1, 2014 – June 30, 2018 Experience Study.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

The actuarial methods used for determining State and Local employer contributions are described below.

1. Actuarial Cost Method

The actuarial cost method for funding calculations is the Projected Unit Credit Cost Method.

The actuarial liability is calculated as the actuarial present value of the projected benefits linearly allocated to periods prior to the valuation year based on service. Refunds are valued as the Accumulated Deductions with interest as of the valuation date as provided by the Division of Pensions and Benefits. The unfunded actuarial liability is the actuarial liability on the valuation date less the actuarial value of assets.

In accordance with Chapter 78, P.L. 2011:

- Beginning with the July 1, 2010 actuarial valuation, the accrued liability contribution shall be computed so that if the contribution is paid annually in level dollars, it will amortize the unfunded accrued liability over an open 30 year period.
- Beginning with the July 1, 2019 actuarial valuation, the accrued liability contribution shall be computed so that if the contribution is paid annually in level dollars, it will amortize the unfunded accrued liability over a closed 30 year period (i.e., for each subsequent actuarial valuation the amortization period shall decrease by one year).
- Beginning with the July 1, 2029 actuarial valuation, when the remaining amortization period reaches 20 years, any increase or decrease in the unfunded accrued liability as a result of actuarial losses or gains for subsequent valuation years shall serve to increase or decrease, respectively, the amortization period for the unfunded accrued liability, unless an increase in the amortization period will cause it to exceed 20 years. If an increase in the amortization period as a result of actuarial losses for a valuation year would exceed 20 years, the accrued liability contribution shall be computed for the valuation year using a 20 year amortization period.

Certain portions of the normal cost and unfunded actuarial liabilities attributable to Local employers are payable by the State and/or over different periods in accordance with the NJ State Statutes.

To the extent that the amortization period remains an open period in future years and depending upon the specific circumstances, it should be noted that in the absence of emerging actuarial gains or contributions made in excess of the actuarially determined contribution, any existing unfunded accrued liability may not be fully amortized in the future.

The non-contributory group life insurance benefit is funded separately through a term cost.

APPENDIX B – ACTUARIAL ASSUMPTIONS AND METHODS

2. Asset Valuation Method

For the purposes of determining contribution rates, an actuarial value of assets is used that dampens the volatility in the market value of assets, resulting in a smoother pattern of contributions.

The actuarial value of assets is adjusted to reflect actual contributions, benefit payments and administrative expenses, and an assumed rate of return on the previous year's assets and current year's cash flow at the prior year's actuarial valuation interest rate, with a further adjustment to reflect 20% of the difference between the resulting value and the actual market value of Plan assets.

3. Contributions

Chapter 83, P.L. 2016 requires the State to make pension contributions on a quarterly basis: at least 25% by September 30, at least 50% by December 31, at least 75% by March 31, and at least 100% by June 30. As such, contributions are assumed to be made on a quarterly basis with the first contribution 15 months after the associated valuation date.

Local employers' contributions are expected to be paid on April 1st, 21 months after the associated valuation date.

Chapter 98, P.L. 2017, the Lottery Enterprise Contribution Act, allows the PERS to receive 21.02% of the proceeds of the Lottery Enterprise, based upon their members' past or present employment in schools and institutions in the State for a term of 30 years. Revenues from Chapter 98, P.L. 2017, the Lottery Enterprise Contribution Act, are assumed to be contributed to the trust on a monthly basis. The State's pension contribution is reduced by the product of the allocable percentage for the PERS, the adjustment percentage, and the special asset value.

Contributions payable in the fiscal year starting on the valuation date are included in the actuarial value of assets as receivable contributions, discounted by the applicable valuation interest rate.

Legislation has provided for additional benefits and/or funding requirements which are included in this valuation and are described as follows.

Early Retirement Incentive Programs

Local employers which elected to participate in various early retirement incentive programs authorized by NJ Statute make contributions to cover the cost of these programs over amortization periods elected by the employer to the extent permitted by NJ Statute.

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Chapter 133, P.L. 2001

Chapter 133, P.L. 2001 increased the accrual rate from 1/60 to 1/55. In addition, it lowered the age required for a veteran benefit equal to 1/55 of highest 12-month Compensation for each Year of Service from 60 to 55.

Chapter 133, P.L. 2001 also established the Benefit Enhancement Fund (BEF) to fund the additional annual employer normal contribution due to the Statute's increased benefits. (Chapter 353, P.L. 2001 extended this coverage to this Statute's additional annual employer normal contribution.) If the assets in the BEF are insufficient to cover the normal contribution for the increased benefits for a valuation period, the State will pay such amount for both the State and Local employers.

Chapter 259, P.L. 2001

Chapter 259, P.L. 2001 established the Workers' Compensation Judges Part of the System with special retirement benefits for Workers' Compensation Judges. See Appendix C for details.

In accordance with the provisions of Chapter 259, P.L. 2001, the additional contributions for these special retirement benefits will be funded by transfers from the Second Injury Fund.

Chapter 366, P.L. 2001

Chapter 366, P.L. 2001 established the Prosecutors Part of the System with special retirement benefits for Prosecutors. See Appendix C for details.

Chapter 366, P.L. 2001 also requires the State be liable for any increase in pension costs to a County that results from the enrollment of Prosecutors in the Prosecutors Part. Any increase in the unfunded actuarial liability arising from the benefits established for the Prosecutors Part are to be amortized over a closed 30 year period.

Chapter 19, P.L. 2009

Chapter 19, P.L. 2009 provided that the State Treasurer will reduce for Local employers the normal and accrued liability contributions to 50 percent of the amount certified for fiscal year 2009. The remaining 50% of the contribution (unfunded liability) will be paid by the Local employers in level annual payments over a period of 15 years with the first payment due in the fiscal year ending June 30, 2012. The unfunded liability will be adjusted by the rate of return on the actuarial value of assets. The legislation also provided that a Local employer may pay 100 percent of the contribution for the fiscal year 2009. Such an employer will be credited with the full payment and any such amounts will not be included in their unfunded liability. In addition, certain Local employers who were eligible to defer 50% of their fiscal year 2009 pension contributions but instead paid 100% of the fiscal year 2009 pension contributions were permitted to defer 50% of their 2010 fiscal year pension contributions. The unfunded liability will be paid by these Local employers over a period of 15 years with the first payment due in the fiscal year ending June 30, 2012. The unfunded liability will be adjusted by the rate of return on the actuarial value of assets.

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4. Changes in Methods Since the Last Valuation

Based on clarification from the Division of Pensions and Benefits, the actuarial liability is based solely on the formula benefit without any comparison to the value of the estimated member annuity.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

This summary of Plan provisions provides an overview of the major provisions of the PERS used in the actuarial valuation. It is not intended to replace the more precise language of the NJ State Statutes, Title 43, Chapter 15A, and if there is any difference between the description of the plan herein and the actual language in the NJ State Statutes, the NJ State Statutes will govern.

1. Eligibility for Membership

Employees of the State or any county, municipality, school district, or public agency employed on a regular basis in a position covered by Social Security and not required to be a member of any other State or local government retirement system. Certain exceptions apply.

- a) Class B (or Tier 1) Member: Any member hired prior to July 1, 2007.
- b) Class D (or Tier 2) Member: Any member hired on or after July 1, 2007 and before November 2, 2008.
- c) Class E (or Tier 3) Member: Any member hired after November 1, 2008 and before May 22, 2010.
- d) Class F (or Tier 4) Member: Any member hired after May 21, 2010 and before June 28, 2011.
- e) Class G (or Tier 5) Member: Any member hired on or after June 28, 2011.

2. Plan Year

The 12-month period beginning on July 1 and ending on June 30.

3. Years of Service

A year of service for each year an employee is a Member of the Retirement System plus service, if any, covered by a prior service liability. Tier 4 and Tier 5 Members must be scheduled to work at least 35 hours per week for the State or 32 hours per week for a Local employer. Tier 3, 4 and 5 Members must have an annual salary of \$7,500 (indexed for inflation) and other members must have an annual salary of \$1,500.

4. Compensation

Base salary upon which contributions by a Member to the Annuity Savings Fund were based. Chapter 113, P.L. 1997 provides that Compensation cannot exceed the compensation limitation of Section 401(a)(17) of the Internal Revenue Code. Chapter 103, P.L. 2007 provides that for a Tier 2, 3, 4 or 5 Member, Compensation cannot exceed the annual maximum wage contribution base for Social Security, pursuant to the Federal Insurance Contribution Act.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

5. Final Compensation

The average annual compensation upon which contributions by a Member are made for the three consecutive years of service immediately preceding retirement, or the highest three fiscal years of service, if greater. Chapter 1, P. L. 2010 provides that for a Tier 4 or Tier 5 Member, Final Compensation is the average annual compensation upon which contributions by a Member are made for the five consecutive years of service immediately preceding retirement, or the highest five fiscal years of service, if greater.

6. Final Year Compensation

The compensation upon which contributions by a Member to the Annuity Savings Fund are based in the last year of service.

7. Accumulated Deductions

The sum of all amounts deducted from the compensation of a Member or contributed by the Member or on the Member's behalf without interest.

8. Member Contributions

Each Member contributes a percentage of Compensation. Effective October 1, 2011, Chapter 78, P.L. 2011 set the member contribution rate at 6.5% and causes it to increase by 1/7th of 1 % each July thereafter until it attained an ultimate rate of 7.5% on July 1, 2018.

For members who are eligible to retire under the Prosecutors Part as provided by Chapter 366, P.L. 2001, Chapter 78, P.L. 2011 set the member contribution rate at 10.0%, effective October 1, 2011.

9. Benefits

- a) **Service Retirement:** For a Tier 1 or Tier 2 Member, age 60. For a Tier 3 or Tier 4 Member, age 62. For a Tier 5 Member, age 65.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of:

- (1) For a Tier 1, 2 or 3 Member, 1/55 of Final Compensation for each Year of Service.
(2) For a Tier 4 or 5 Member, 1/60 of Final Compensation for each Year of Service.

- b) **Early Retirement:** Prior to eligibility for Service Retirement. For a Tier 1, 2, 3 or 4 Member, 25 Years of Service. For a Tier 5 Member, 30 Years of Service.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of:

- (1) For a Tier 1 Member, the Service Retirement benefit reduced by 1/4 of one percent for each month the retirement date precedes age 55.
- (2) For a Tier 2 Member, the Service Retirement benefit reduced by 1/12 of one percent for each month the retirement date precedes age 60 through age 55 and by 1/4 of one percent for each month the retirement date precedes age 55.
- (3) For a Tier 3 or 4 Member, the Service Retirement benefit reduced by 1/12 of one percent for each month the retirement date precedes age 62 through age 55 and by 1/4 of one percent for each month the retirement date precedes age 55.
- (4) For a Tier 5 Member, the Service Retirement benefit reduced by 1/4 of one percent for each month the retirement date precedes age 65.

- c) **Veteran Retirement:** Age 55 with 25 Years of Service or Age 60 with 20 Years of Service for a qualified military veteran who retires directly from active service.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of the greater of:

- (1) 54.5% of highest 12-month Compensation, or
- (2) For a member who is at least age 55 with 35 Years of Service, 1/55 of highest 12-month Compensation for each Year of Service.

Veterans may receive a Service Retirement benefit if greater.

- d) **Deferred Retirement:** Termination of service prior to eligibility for Service Retirement with 10 Years of Service.

Benefit is either:

- (1) A refund of Accumulated Deductions plus, if the member has completed three years of service, interest accumulated at 2.0% per annum; or
- (2) A deferred life annuity, commencing at age 60 for a Tier 1 or Tier 2 Member, age 62 for a Tier 3 or Tier 4 Member or age 65 for a Tier 5 Member, comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of the Service Retirement benefit based on Final Compensation and Years of Service at date of termination.

For Members who die during the deferral period, the benefit is a return of Accumulated Deductions with credited interest.

- e) **Non-Vested Termination:** Termination of service prior to eligibility for Service Retirement and less than 10 Years of Service.

Benefit is a refund of Accumulated Deductions plus, if the member has completed three years of service, interest accumulated at 2.0% per annum.

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APPENDIX C – SUMMARY OF PLAN PROVISIONS

f) **Death Benefits**

- (1) Ordinary Death Before Retirement: Death of an active contributing Member. Benefit is equal to:
 - a. Lump sum payment equal to 150% of Final Year Compensation, also known as the non-contributory group life insurance benefit, plus
 - b. Accumulated Deductions with credited interest.

- (2) Accidental Death Before Retirement: Death of an active Member resulting from injuries received from an accident during performance of duty and not a result of willful negligence. Benefit is equal to:
 - a. Lump sum payment equal to 150% of Final Year Compensation, also known as the non-contributory group life insurance benefit, plus
 - b. Spouse life annuity of 50% of Final Year Compensation payable until spouse's death or remarriage. If there is no surviving spouse or upon death or remarriage, a total of 20% (35%, 50%) of Final Year Compensation payable to one (two, three or more) dependent child(ren). If there is no surviving spouse or dependent child(ren), 25% (40%) of Final Year Compensation to one (two) dependent parent(s). If there is no surviving spouse, dependent child(ren) or parent(s), the benefit is a refund of Accumulated Deductions with credited interest.

- (3) Death After Retirement: Death of a retired Member. Benefit is equal to:
 - a. Lump sum payment equal to 3/16 of Final Year Compensation for a Member retired under Service, Early, Veteran or Deferred Retirement with 10 Years of Service. For a Member receiving a Disability benefit, lump sum payment of 150% of Final Year Compensation if death occurs prior to age 60 and 3/16 of Final Compensation if death occurs after age 60. This benefit is also known as the non-contributory group life insurance benefit, plus
 - b. Any survivor benefit due under the Member's optional form of payment election. Previously granted COLAs also apply to life annuities.

Members are also eligible for a voluntary, employee-paid life insurance policy, known as the contributory group life insurance policy. This benefit is not paid through the System and is not considered for valuation purposes.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

g) **Disability Retirement**

- (1) **Ordinary Disability Retirement**: 10 years of service and totally and permanently incapacitated from the performance of normal or assigned duties. Only available to Tier 1, 2 and 3 Members.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of:

- a. 1.64% of Final Compensation for each Year of Service; or
- b. 43.6% of Final Compensation.

- (2) **Accidental Disability Retirement**: 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. Only available to Tier 1, 2 and 3 Members.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 72.7% of Compensation at the date of injury.

The pension portion of the benefit will be offset for any periodic Workers' Compensation benefits.

Tier 4 and Tier 5 Members are eligible for long-term disability coverage. This benefit is not paid through the System and is not considered for valuation purposes. Both Member and employer contributions to the System continue while on long-term disability, with the policy covering the Member portion. The long-term disability benefit equals 60% of Final Year Compensation and may be offset for other periodic benefits, such as Workers' Compensation, short-term disability or Social Security. The long-term disability benefit may continue through the earlier of age 70 or commencement of a retirement benefit under the System.

10. **Benefits for Special Employee Groups**

Certain members qualify for enrollment into special employee groups. Such members receive the greater of the special benefits described below or the regular PERS benefit described above. For benefit types not explicitly mentioned, the regular PERS benefit applies.

a) **Law Enforcement Officers (LEOs)**:

Members employed in eligible job titles as well as individuals who do not meet the age or medical requirements for entry into the Police and Firemen's Retirement System (PFRS).

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(1) Service and Special Retirement

Mandatory retirement at age 65. Veterans with less than 20 Years of Service at age 65 must retire upon attainment of 20 Years of Service or age 70, whichever is earlier. Voluntary retirement prior to those ages.

a. Service Retirement: Age 55 after 20 Years of LEO Service.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 2% of Final Compensation for each Year of LEO Service up to 25 years plus 1% of Final Compensation for each Year of LEO Service over 25 years.

The Member is also eligible for a regular PERS benefit based on any non-LEO service.

b. Special Retirement: 25 Years of LEO Service.

Benefit is the Service Retirement benefit plus 5% of Final Compensation with a maximum of 70% of Final Compensation.

(2) Ordinary Disability Retirement: 5 Years of LEO Service.

Benefit is the regular PERS Ordinary Disability benefit.

(3) Death Benefits:

Benefit is the regular PERS Death benefit except, upon Accidental Disability Retirement, the minimum lump sum payment is \$5,000.

b) **Legislative Retirement System (LRS)**:

Members of the State Legislature. Chapter 92, P.L. 2007 closed LRS to new members enrolled on or after July 1, 2007.

(1) Special Legislative Retirement: Age 60.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 3% of Final Compensation for each Year of Legislative Service with a maximum of two-thirds of Final Compensation.

The Member is also eligible for a regular PERS benefit based on any non-legislative service.

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- (2) Deferred Retirement: Termination of service prior to eligibility for Service or Special Legislative Retirement with 8 Years of Legislative Service.

Benefit is either:

- a. A refund of Accumulated Deductions plus, if the Member has completed three years of service, interest accumulated at 2.0% per annum; or
- b. A deferred life annuity, commencing at age 60, comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of the Service or Special Legislative Retirement benefit based on Final Compensation and Years of Service at date of termination.

c) **Prosecutors Part (Chapter 366, P.L. 2001):**

Covers prosecutors as well as members employed in certain other related job titles. Chapter 1. P.L. 2010 closed the Prosecutors Part to new members enrolled on or after May 22, 2010.

(1) Service and Special Retirement

Mandatory retirement at age 70. Voluntary retirement prior to that age.

In addition to the benefits described below, the member is eligible for a regular PERS benefit based on any non-Prosecutors Part service.

- a. Service Retirement: For a Prosecutors Part Member enrolled as of January 7, 2002, age 55 or 20 Years of Prosecutors Part Service. For a Prosecutors Part Member enrolled after January 7, 2002, age 55.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of the greater of:

- i. 2% of Final Year Compensation for each Year of Prosecutors Part Service up to 30 years plus 1% of Final Year Compensation for each Year of Prosecutors Part Service over 30 years.
- ii. 50% of Final Year Compensation for Prosecutors Part Members with 20 or more Years of Prosecutors Part Service.
- iii. 1/60 of Final Year Compensation for each Year of Prosecutors Part Service.

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b. Special Retirement: 25 Years of Prosecutors Part Service.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 65% of Final Year Compensation plus 1% of Final Year Compensation for each Year of Prosecutors Part Service in excess of 25 years with a maximum of 70% of Final Compensation.

(2) Deferred Retirement: Termination of service prior to eligibility for Service or Special Retirement with 10 Years of Prosecutors Part Service.

Benefit is either:

- a. A refund of Accumulated Deductions plus, if the Member has completed three years of service, interest accumulated at 2.0% per annum; or
- b. A deferred life annuity, commencing at age 55, comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 2% of Final Year Compensation for each Year of Prosecutors Part Service.

(3) Death Benefits:

Benefit is the regular PERS Death benefit except, upon Service, Special or Deferred Prosecutors Part Retirement with 10 Years of Prosecutors Part Service, the lump sum payment equals 50% of Final Year Compensation.

d) **Workers Compensation Judges Part (WCJ) (Chapter 259, P.L. 2001)**:

Member employed in an eligible job title by the Division of Workers' Compensation. Chapter 92, P.L. 2007 closed the Workers Compensation Judges Part to new members enrolled on or after July 1, 2007.

(1) Service Retirement:

Mandatory retirement age 70. Voluntary retirement prior to that age.

- a. Age 70 and 10 Years of WCJ Service; or
Age 65 and 15 Years of WCJ Service; or
Age 60 and 20 Years of WCJ Service.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 75% of contractual Compensation at the date of retirement.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

- b. Age 65, 5 consecutive Years of WCJ Service and 15 Years of Aggregate PERS Service; or
Age 60, 5 consecutive Years of WCJ Service and 20 Years of Aggregate PERS Service.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 50% of contractual Compensation at the date of retirement.

- c. Age 60, 5 consecutive Years of WCJ Service and 15 Years of Aggregate PERS Service.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 2% of contractual Compensation at the date of retirement for each Year of Aggregate PERS Service up to 25 years plus 1% of contractual Compensation at the date of retirement for each Year of Aggregate PERS Service over 25 years.

- d. Age 60.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 2% of contractual Compensation at the date of retirement for each Year of WCJ Service up to 25 years plus 1% of contractual Compensation at the date of retirement for each Year of Aggregate PERS Service over 25 years.

- (2) Early Retirement: Prior to eligibility for Service Retirement and 5 consecutive Years of WCJ Service and 25 Years of Aggregate PERS Service.

Benefit is an annual retirement allowance comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 2% of contractual Compensation at the date of retirement for each Year of Aggregate PERS Service up to 25 years plus 1% of contractual Compensation at the date of retirement for each Year of Aggregate PERS Service over 25 years, actuarially reduced for commencement prior to age 60.

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- (3) Deferred Retirement: Termination of service prior to eligibility for Service Retirement with 5 consecutive Years of WCJ Service and 10 Years of Aggregate PERS Service.

Benefit is either:

- a. A refund of Accumulated Deductions plus, if the Member has completed three years of service, interest accumulated at 2.0% per annum; or
- b. A deferred life annuity, commencing at age 60, comprised of a member annuity plus an employer pension which together will provide a total retirement allowance of 2% of contractual Compensation at the date of retirement for each Year of Aggregate PERS Service up to 25 years plus 1% of contractual Compensation at the date of retirement for each Year of Aggregate PERS Service over 25 years.

- (4) Death Benefits

- a. Before Retirement: Death of an active WCJ Member. Benefit is equal to:

- i. Lump sum equal to 150% of contractual Compensation at the date of death, plus
- ii. Spousal life annuity of 25% of contractual Compensation at the date of death payable until spouse's remarriage plus 10% (15%) to one (two or more) dependent child(ren). If there is no surviving spouse, or upon death or remarriage, a total of 15% (20%, 30%) of contractual Compensation at the date of death payable to one (two, three or more) dependent child(ren). If there is no surviving spouse or dependent child(ren), 20% (30%) of contractual Compensation at the date of death to one (two) dependent parent(s). If there is no surviving spouse, dependent child(ren) or parent(s), the benefit is a refund of Accumulated Deductions with interest.

- b. After Retirement: Death of a retired WCJ Member. Benefit is equal to:

- i. Lump sum equal to 25% of contractual Compensation at the date of death for a Member retired under Service or Early WCJ Retirement with 10 Years of Aggregate PERS Service. For a Member receiving a Disability benefit, lump sum payment of 150% of contractual Compensation at the date of death if death occurs prior to age 60 and 25% of contractual Compensation at the date of death if death occurs after age 60, plus
- ii. Any survivor benefit due under the Member's optional form of payment election. Previously granted COLAs also apply to life annuities.

APPENDIX C – SUMMARY OF PLAN PROVISIONS

11. Optional Forms of Payment

The member may elect the following forms of payment.

- a) Maximum Option: Single life annuity with a return of the balance of the Accumulated Deductions with credited interest.
- b) Option 1: Single life annuity with a return of the balance of the initial reserve.
- 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.

12. Cost-of-Living Adjustments

Also known as Pension Adjustments. Provided annually to retirees and survivors after 24 months of retirement prior to July 1, 2011. Chapter 78, P.L. 2011 eliminated future adjustments effective July 1, 2011. Adjustments may be reinstated in the future subject to certain conditions outlined in Chapter 78, P.L. 2011.

13. Changes in Plan Provisions Since Last Valuation

None.

**THE PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF NEW JERSEY
GASB 67 REPORTING FOR JUNE 30, 2019 MEASUREMENT DATE**

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 1 - Projection of the Pension Plan's Fiduciary Net Position
(In Thousands)
Projections Commence June 30, 2019

Year	Projected Beginning Fiduciary Net Position	Projected Member Contributions	Projected State Contributions	Projected State- paid Local Contributions	Projected Local Employer Contributions	Projected Lottery Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings	Projected Ending Fiduciary Net Position
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	(j) = (a) + (b) + (c) + (d) + (e) + (f) - (g) - (h) + (i)
1	\$ 28,809,086	\$ 775,717	\$ 798,239	\$ 8,247	\$ 992,863	\$ 225,245	\$ 4,425,526	\$ 23,087	\$ 1,936,060	\$ 29,096,843
2	29,096,843	737,664	903,372	8,498	1,182,258	228,362	4,584,800	23,927	1,955,454	29,503,724
3	29,503,724	701,345	940,902	29,816	1,200,806	231,038	4,736,020	24,731	1,979,391	29,826,271
4	29,826,271	666,004	1,112,016	40,289	1,315,448	233,729	4,879,779	25,496	2,002,532	30,291,015
5	30,291,015	631,466	1,145,751	40,035	1,333,466	236,565	5,016,705	26,229	2,030,414	30,665,778
6	30,665,778	597,698	1,180,614	39,703	1,350,355	239,449	5,146,722	26,926	2,052,272	30,952,220
7	30,952,220	564,215	1,215,693	39,347	1,365,732	242,366	5,272,376	27,599	2,068,089	31,147,687
8	31,147,687	531,028	1,250,947	38,976	1,370,294	245,329	5,392,029	28,240	2,077,577	31,241,569
9	31,241,569	503,075	1,285,188	38,666	1,378,365	248,120	5,505,283	28,850	2,080,385	31,241,235
10	31,241,235	475,281	1,320,906	38,393	1,386,418	250,046	5,611,897	29,424	2,076,843	31,147,801
11	31,147,801	447,505	1,357,626	38,245	1,394,357	252,573	5,710,402	29,949	2,067,112	30,964,868
12	30,964,868	419,895	1,395,311	38,358	1,401,743	255,125	5,800,241	30,425	2,051,445	30,696,079
13	30,696,079	392,877	1,399,327	38,697	1,393,650	257,702	5,877,722	30,835	2,029,088	30,298,863
14	30,298,863	366,511	1,402,973	39,910	1,385,219	260,305	5,943,251	31,179	1,998,184	29,777,537
15	29,777,537	341,031	1,406,100	44,188	1,375,370	262,935	5,994,194	31,441	1,959,170	29,140,696
16	29,140,696	316,841	1,403,632	27,836	1,366,407	265,590	6,028,439	31,613	1,912,030	28,372,981
17	28,372,981	294,027	1,403,323	21,733	1,358,730	268,272	6,045,142	31,689	1,856,726	27,498,961
18	27,498,961	272,644	1,403,244	19,031	1,351,669	270,981	6,044,170	31,671	1,794,746	26,535,436
19	26,535,436	252,743	1,403,152	17,554	1,345,159	273,717	6,025,811	31,558	1,727,195	25,497,587
20	25,497,587	234,285	1,403,138	16,555	1,339,566	276,481	5,990,450	31,357	1,655,109	24,400,914
21	24,400,914	217,279	1,409,001	15,762	1,334,320	279,272	5,937,898	31,068	1,579,714	23,267,295
22	23,267,295	201,528	1,415,082	15,095	1,329,657	282,091	5,870,200	30,700	1,502,319	22,112,167
23	22,112,167	186,399	1,421,210	14,515	1,325,473	284,938	5,790,916	30,271	1,423,852	20,947,368
24	20,947,368	170,892	1,426,905	14,004	1,321,265	287,814	5,706,509	29,814	1,344,864	19,776,789
25	19,776,789	155,314	1,431,793	13,560	1,316,252	290,718	5,615,254	29,320	1,265,672	18,605,523
26	18,605,523	139,922	1,436,724	13,179	1,311,238	293,652	5,516,889	28,791	1,186,688	17,441,245
27	17,441,245	124,219	1,442,048	12,850	1,305,685	296,614	5,415,599	28,247	1,108,286	16,287,101
28	16,287,101	108,181	1,447,602	12,569	1,299,296	299,607	5,311,518	27,688	1,030,672	15,145,823
29	15,145,823	91,609	1,510,478	12,337	1,292,162	0	5,207,910	27,130	944,984	13,762,351
30	13,762,351	75,962	1,509,082	12,149	1,284,179	0	5,096,699	26,532	851,268	12,371,760
31	12,371,760	62,707	1,515,807	11,999	1,276,759	0	4,970,738	25,860	757,866	11,000,298
32	11,000,298	51,417	1,522,984	11,882	1,270,032	0	4,741,441	24,633	669,470	9,760,009
33	9,760,009	41,810	1,530,501	11,797	1,263,808	0	4,594,369	23,855	587,487	8,577,188
34	8,577,188	33,643	1,538,314	11,740	1,258,112	0	4,440,110	23,041	509,842	7,465,689
35	7,465,689	26,771	1,546,409	11,705	1,252,779	0	4,278,910	22,192	437,488	6,439,739
36	6,439,739	21,066	1,554,765	11,688	1,247,895	0	4,112,528	21,318	371,357	5,512,663
37	5,512,663	16,378	1,563,400	11,686	946,116	0	3,941,861	20,421	307,272	4,395,234
38	4,395,234	12,591	1,572,288	11,695	129,257	0	3,768,344	19,512	221,213	2,554,422
39	2,554,422	9,540	1,581,436	11,713	80,992	0	3,593,205	18,595	97,716	724,020
40	0	0	0	0	0	0	3,416,918	17,673	0	0
41	0	0	0	0	0	0	3,240,939	16,754	0	0
42	0	0	0	0	0	0	3,066,728	15,844	0	0
43	0	0	0	0	0	0	2,895,020	14,948	0	0
44	0	0	0	0	0	0	2,727,042	14,073	0	0
45	0	0	0	0	0	0	2,563,058	13,219	0	0
46	0	0	0	0	0	0	2,403,837	12,391	0	0
47	0	0	0	0	0	0	2,249,526	11,589	0	0
48	0	0	0	0	0	0	2,100,441	10,816	0	0
49	0	0	0	0	0	0	1,956,559	10,071	0	0
50	0	0	0	0	0	0	1,817,933	9,355	0	0
51	0	0	0	0	0	0	1,684,597	8,667	0	0
52	0	0	0	0	0	0	1,556,567	8,007	0	0
53	0	0	0	0	0	0	1,433,864	7,376	0	0
54	0	0	0	0	0	0	1,316,569	6,774	0	0
55	0	0	0	0	0	0	1,204,675	6,199	0	0
56	0	0	0	0	0	0	1,098,179	5,653	0	0
57	0	0	0	0	0	0	997,087	5,136	0	0
58	0	0	0	0	0	0	901,389	4,646	0	0
59	0	0	0	0	0	0	811,074	4,184	0	0
60	0	0	0	0	0	0	726,148	3,749	0	0

**THE PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF NEW JERSEY
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APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 1 - Projection of the Pension Plan's Fiduciary Net Position
(In Thousands)
Projections Commence June 30, 2019

Year	Projected Beginning Fiduciary Net Position	Projected Member Contributions	Projected State Contributions	Projected State-paid Local Contributions	Projected Local Employer Contributions	Projected Lottery Contributions	Projected Benefit Payments	Projected Administrative Expenses	Projected Investment Earnings	Projected Ending Fiduciary Net Position (j) = (a) + (b) + (c) + (d) + (e) + (f) - (g) - (h) + (i)
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)	
61	0	0	0	0	0	0	646,597	3,342	0	0
62	0	0	0	0	0	0	572,430	2,962	0	0
63	0	0	0	0	0	0	503,647	2,610	0	0
64	0	0	0	0	0	0	440,230	2,285	0	0
65	0	0	0	0	0	0	382,125	1,986	0	0
66	0	0	0	0	0	0	329,257	1,714	0	0
67	0	0	0	0	0	0	281,509	1,468	0	0
68	0	0	0	0	0	0	238,717	1,247	0	0
69	0	0	0	0	0	0	200,681	1,051	0	0
70	0	0	0	0	0	0	167,156	877	0	0
71	0	0	0	0	0	0	137,869	725	0	0
72	0	0	0	0	0	0	112,523	593	0	0
73	0	0	0	0	0	0	90,804	479	0	0
74	0	0	0	0	0	0	72,393	383	0	0
75	0	0	0	0	0	0	56,968	302	0	0
76	0	0	0	0	0	0	44,209	235	0	0
77	0	0	0	0	0	0	33,800	180	0	0
78	0	0	0	0	0	0	25,436	136	0	0
79	0	0	0	0	0	0	18,823	101	0	0
80	0	0	0	0	0	0	13,686	74	0	0
81	0	0	0	0	0	0	9,771	53	0	0
82	0	0	0	0	0	0	6,845	37	0	0
83	0	0	0	0	0	0	4,704	26	0	0
84	0	0	0	0	0	0	3,172	17	0	0
85	0	0	0	0	0	0	2,100	12	0	0
86	0	0	0	0	0	0	1,367	8	0	0
87	0	0	0	0	0	0	878	5	0	0
88	0	0	0	0	0	0	559	3	0	0
89	0	0	0	0	0	0	355	2	0	0
90	0	0	0	0	0	0	227	1	0	0
91	0	0	0	0	0	0	147	1	0	0
92	0	0	0	0	0	0	98	1	0	0
93	0	0	0	0	0	0	67	0	0	0
94	0	0	0	0	0	0	47	0	0	0
95	0	0	0	0	0	0	34	0	0	0
96	0	0	0	0	0	0	25	0	0	0
97	0	0	0	0	0	0	19	0	0	0
98	0	0	0	0	0	0	14	0	0	0
99	0	0	0	0	0	0	10	0	0	0
100	0	0	0	0	0	0	8	0	0	0
101	0	0	0	0	0	0	6	0	0	0
102	0	0	0	0	0	0	4	0	0	0
103	0	0	0	0	0	0	3	0	0	0
104	0	0	0	0	0	0	2	0	0	0
105	0	0	0	0	0	0	1	0	0	0
106	0	0	0	0	0	0	1	0	0	0
107	0	0	0	0	0	0	1	0	0	0
108	0	0	0	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0	0	0	0

**THE PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF NEW JERSEY
GASB 67 REPORTING FOR JUNE 30, 2019 MEASUREMENT DATE**

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 2 - Actuarial Present Values of Projected Benefit Payments
(In Thousands)

Projections Commence June 30, 2019

* From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (a)
** From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (g)

Year	Projected Beginning Fiduciary Net Position*	Projected Benefit Payments for current Plan participants**	"Funded" Portion of Benefit Payments	"Unfunded" Portion of Benefit Payments	Present Value of "Funded" Benefit Payments	Present Value of "Unfunded" Benefit Payments	Present Value of Benefit Payments Using the Single Discount Rate
(a)	(b)	(c)	(d) = (c) if (b) >= (c)	(e) = (c) - (d)	(f) = (d) / (1+7.00%) ⁿ [(a) - .5]	(g) = (e) / (1+3.50%) ⁿ [(a) - .5]	(h) = (c) / (1+6.28%) ⁿ [(a) - .5]
1	\$ 28,809,086	\$ 4,425,526	\$ 4,425,526	\$ 0	\$ 4,278,318	\$ 0	\$ 4,292,802
2	29,096,843	4,584,800	4,584,800	0	4,142,331	0	4,184,545
3	29,503,724	4,736,020	4,736,020	0	3,999,025	0	4,067,180
4	29,826,271	4,879,779	4,879,779	0	3,850,853	0	3,943,046
5	30,291,015	5,016,705	5,016,705	0	3,699,914	0	3,814,189
6	30,665,778	5,146,722	5,146,722	0	3,547,480	0	3,681,851
7	30,952,220	5,272,376	5,272,376	0	3,396,345	0	3,548,900
8	31,147,687	5,392,029	5,392,029	0	3,246,190	0	3,415,007
9	31,241,569	5,505,283	5,505,283	0	3,097,544	0	3,280,733
10	31,241,235	5,611,897	5,611,897	0	2,950,963	0	3,146,682
11	31,147,801	5,710,402	5,710,402	0	2,806,319	0	3,012,740
12	30,964,868	5,800,241	5,800,241	0	2,663,990	0	2,879,341
13	30,696,079	5,877,722	5,877,722	0	2,522,968	0	2,745,415
14	30,298,863	5,943,251	5,943,251	0	2,384,202	0	2,612,010
15	29,777,537	5,994,194	5,994,194	0	2,247,326	0	2,478,754
16	29,140,696	6,028,439	6,028,439	0	2,112,303	0	2,345,630
17	28,372,981	6,045,142	6,045,142	0	1,979,585	0	2,213,161
18	27,498,961	6,044,170	6,044,170	0	1,849,782	0	2,082,069
19	26,535,436	6,025,811	6,025,811	0	1,723,517	0	1,953,106
20	25,497,587	5,990,450	5,990,450	0	1,601,311	0	1,826,929
21	24,400,914	5,937,898	5,937,898	0	1,483,424	0	1,703,911
22	23,267,295	5,870,200	5,870,200	0	1,370,571	0	1,584,963
23	22,112,167	5,790,916	5,790,916	0	1,263,608	0	1,471,178
24	20,947,368	5,706,509	5,706,509	0	1,163,729	0	1,364,082
25	19,776,789	5,615,254	5,615,254	0	1,070,205	0	1,262,965
26	18,605,523	5,516,889	5,516,889	0	982,670	0	1,167,530
27	17,441,245	5,415,599	5,415,599	0	901,522	0	1,078,381
28	16,287,101	5,311,518	5,311,518	0	826,351	0	995,168
29	15,145,823	5,207,910	5,207,910	0	757,226	0	918,106
30	13,762,351	5,096,699	5,096,699	0	692,576	0	845,416
31	12,371,760	4,970,738	4,970,738	0	631,271	0	775,808
32	11,000,298	4,741,441	4,741,441	0	562,758	0	696,299
33	9,760,009	4,594,369	4,594,369	0	509,628	0	634,838
34	8,577,188	4,440,110	4,440,110	0	460,296	0	577,275
35	7,465,689	4,278,910	4,278,910	0	414,565	0	523,449
36	6,439,739	4,112,528	4,112,528	0	372,379	0	473,371
37	5,512,663	3,941,861	3,941,861	0	333,575	0	426,920
38	4,395,234	3,768,344	3,768,344	0	298,029	0	384,014
39	2,554,422	3,593,205	2,554,422	1,038,783	188,807	276,262	344,533
40	0	3,416,918	0	3,416,918	0	877,992	308,273
41	0	3,240,939	0	3,240,939	0	804,612	275,121
42	0	3,066,728	0	3,066,728	0	735,615	244,951
43	0	2,895,020	0	2,895,020	0	670,945	217,574
44	0	2,727,042	0	2,727,042	0	610,642	192,841
45	0	2,563,058	0	2,563,058	0	554,514	170,537
46	0	2,403,837	0	2,403,837	0	502,480	150,493
47	0	2,249,526	0	2,249,526	0	454,323	132,512
48	0	2,100,441	0	2,100,441	0	409,868	116,420
49	0	1,956,559	0	1,956,559	0	368,881	102,038
50	0	1,817,933	0	1,817,933	0	331,154	89,207
51	0	1,684,597	0	1,684,597	0	296,489	77,780
52	0	1,556,567	0	1,556,567	0	264,691	67,623
53	0	1,433,864	0	1,433,864	0	235,581	58,612
54	0	1,316,569	0	1,316,569	0	208,995	50,637
55	0	1,204,675	0	1,204,675	0	184,766	43,596
56	0	1,098,179	0	1,098,179	0	162,736	37,394
57	0	997,087	0	997,087	0	142,759	31,946
58	0	901,389	0	901,389	0	124,693	27,174
59	0	811,074	0	811,074	0	108,405	23,006
60	0	726,148	0	726,148	0	93,772	19,380

**THE PUBLIC EMPLOYEES' RETIREMENT SYSTEM OF NEW JERSEY
GASB 67 REPORTING FOR JUNE 30, 2019 MEASUREMENT DATE**

APPENDIX D – DETERMINATION OF DISCOUNT RATE

Table 2 - Actuarial Present Values of Projected Benefit Payments
(In Thousands)

Projections Commence June 30, 2019

* From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (a)

** From Table 1 - Projection of the Pension Plan's Fiduciary Net Position, column (g)

Year	Projected Beginning Fiduciary Net Position*	Projected Benefit Payments for current Plan participants**	"Funded" Portion of Benefit Payments	"Unfunded" Portion of Benefit Payments	Present Value of "Funded" Benefit Payments	Present Value of "Unfunded" Benefit Payments	Present Value of Benefit Payments Using the Single Discount Rate
(a)	(b)	(c)	(d) = (c) if (b) >= (c)	(e) = (c) - (d)	(f) = (d) / (1+7.00%)^(a) - .5]	(g) = (e) / (1+3.50%)^(a) - .5]	(h) = (c) / (1+6.28%)^(a) - .5]
61	0	646,597	0	646,597	0	80,676	16,238
62	0	572,430	0	572,430	0	69,007	13,526
63	0	503,647	0	503,647	0	58,662	11,197
64	0	440,230	0	440,230	0	49,541	9,209
65	0	382,125	0	382,125	0	41,548	7,521
66	0	329,257	0	329,257	0	34,589	6,098
67	0	281,509	0	281,509	0	28,573	4,906
68	0	238,717	0	238,717	0	23,410	3,914
69	0	200,681	0	200,681	0	19,015	3,096
70	0	167,156	0	167,156	0	15,303	2,426
71	0	137,869	0	137,869	0	12,195	1,883
72	0	112,523	0	112,523	0	9,616	1,446
73	0	90,804	0	90,804	0	7,498	1,098
74	0	72,393	0	72,393	0	5,775	824
75	0	56,968	0	56,968	0	4,391	610
76	0	44,209	0	44,209	0	3,292	445
77	0	33,800	0	33,800	0	2,432	320
78	0	25,436	0	25,436	0	1,768	227
79	0	18,823	0	18,823	0	1,264	158
80	0	13,686	0	13,686	0	888	108
81	0	9,771	0	9,771	0	613	73
82	0	6,845	0	6,845	0	415	48
83	0	4,704	0	4,704	0	275	31
84	0	3,172	0	3,172	0	179	20
85	0	2,100	0	2,100	0	115	12
86	0	1,367	0	1,367	0	72	7
87	0	878	0	878	0	45	5
88	0	559	0	559	0	28	3
89	0	355	0	355	0	17	2
90	0	227	0	227	0	10	1
91	0	147	0	147	0	7	1
92	0	98	0	98	0	4	0
93	0	67	0	67	0	3	0
94	0	47	0	47	0	2	0
95	0	34	0	34	0	1	0
96	0	25	0	25	0	1	0
97	0	19	0	19	0	1	0
98	0	14	0	14	0	0	0
99	0	10	0	10	0	0	0
100	0	8	0	8	0	0	0
101	0	6	0	6	0	0	0
102	0	4	0	4	0	0	0
103	0	3	0	3	0	0	0
104	0	2	0	2	0	0	0
105	0	1	0	1	0	0	0
106	0	1	0	1	0	0	0
107	0	1	0	1	0	0	0
108	0	0	0	0	0	0	0
109	0	0	0	0	0	0	0
110	0	0	0	0	0	0	0
111	0	0	0	0	0	0	0
112	0	0	0	0	0	0	0
113	0	0	0	0	0	0	0
114	0	0	0	0	0	0	0
115	0	0	0	0	0	0	0
					\$ 72,383,456	\$ 8,891,409	\$ 81,274,865

APPENDIX E – GLOSSARY OF TERMS

1. Actuarially Determined Contribution

A target or recommended contribution for the reporting period, determined in conformity with Actuarial Standards of Practice based on the most recent measurement available when the contribution for the reporting period was adopted.

2. Actuarial Valuation Date

The date as of which an actuarial valuation is performed. This date may be up to 24 months prior to the measurement date and up to 30 months prior to the employer's reporting date.

3. Entry Age Actuarial Cost Method

The actuarial cost method required for GASB 67 calculations. Under this method, the actuarial present value of the projected benefits of each individual included in an actuarial valuation is allocated on a level basis over the earnings of the individual between entry age and assumed exit ages. The portion of this actuarial present value allocated to a valuation year is called the Service Cost. The portion of this actuarial present value not provided for at a valuation date by the actuarial present value of future service costs is called the Total Pension Liability.

4. Measurement Date

The date as of which the Total Pension Liability and Plan Fiduciary Net Position are measured. The Total Pension Liability may be projected from the Actuarial Valuation Date to the Measurement Date. The Measurement Date must be the same as the Reporting Date for the plan.

5. Net Pension Liability

The liability of employers and nonemployer contributing entities for employees for benefits provided through a defined benefit pension plan. It is calculated as the Total Pension Liability less the Plan Fiduciary Net Position.

6. Plan Fiduciary Net Position

The fair or market value of assets.

7. Reporting Date

The last day of the plan or employer's fiscal year.

APPENDIX E – GLOSSARY OF TERMS

8. Service Cost

The portion of the actuarial present value of projected benefit payments that is attributed to the current period of employee service in conformity with the requirements of GASB 67. The Service Cost is the normal cost calculated under the entry age actuarial cost method.

9. Total Pension Liability

The portion of the actuarial present value of projected benefit payments that is attributed to past periods of employee service in conformity with the requirements of GASB 67. The Total Pension Liability is the actuarial liability calculated under the entry age actuarial cost method. This measurement generally is not appropriate for estimating the cost to settle the Plan's liabilities.