

**Vermont State Employees'  
Retirement System  
Actuarial Valuation and  
Review as of June 30, 2017**

The logo for Segal Consulting is a large, dark blue, stylized shape resembling a compass needle or a stylized 'S' with a sharp point at the bottom. It is positioned on the right side of the page. The text 'Segal Consulting' is written in white, sans-serif font across the upper part of this shape, preceded by a white star icon.

 Segal Consulting

This report has been prepared at the request of the Board of Trustees to assist in administering the System. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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October 23, 2017

Board of Trustees  
Vermont State Employees' Retirement System  
Montpelier, Vermont 05609

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of June 30, 2017, of the Vermont State Employees' Retirement System. This report summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirement for the fiscal year ending June 30, 2019.

This report was prepared in accordance with generally accepted actuarial principles and practices at the request of the Board to assist in administering the Retirement System. The census information and financial information on which our calculations were based was prepared by the Office of the State Treasurer. That assistance is gratefully acknowledged.

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

We look forward to reviewing this report and to answering any questions at the next Board meeting.

Sincerely,

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

By:

A handwritten signature in blue ink, appearing to read "Kathleen A. Riley", written over a horizontal line.

Kathleen A. Riley, FSA, MAAA, EA  
Senior Vice President and Actuary

A handwritten signature in blue ink, appearing to read "Matthew A. Strom", written over a horizontal line.

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

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# Section 1: Actuarial Valuation Summary

## Purpose and Basis

This report was prepared by Segal Consulting to present a valuation of the Plan as of June 30, 2017, pursuant to section 471, subsection (k), of Title 3, Chapter 16, Vermont Statutes Annotated, relating to the Vermont State Employees' Retirement System. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits. The measurements shown in this actuarial valuation may not be applicable for other purposes. In particular, the measures herein are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the Plan's benefit obligations. Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements; and changes in plan provisions or applicable law.

Certain disclosure information required by GASB Statements No 67 and 68 as of June 30, 2017 for the System is provided in a separate report.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Plan, as administered by the Board;
- The characteristics of covered active members, inactive members, and retired members and beneficiaries as of June 30, 2017, provided by the Office of the State Treasurer;
- The unaudited assets of the Plan as of June 30, 2017, provided by the Office of the State Treasurer;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions, regarding employee terminations, retirement, death, etc.; and
- The funding policy prescribed by State statute.

## Valuation Highlights

1. Segal strongly recommends an actuarial funding method that targets 100% funding of the actuarial accrued liability. Generally, this implies payments that are ultimately at least enough to cover normal cost, interest on the unfunded actuarial accrued liability and the principal balance. The funding policy set in the Vermont State Pension Code meets this standard.
2. Actual employer contributions made during the fiscal year ending June 30, 2017, were \$60,280,480, or 121.1% of the actuarially determined contribution. In the prior fiscal year, actual employer contributions were \$54,347,060, or 117.6% of the prior year's actuarially determined contribution.
3. The actuarially determined contribution for the fiscal year ending June 30, 2018, is \$52,065,397 as determined with the June 30, 2016, actuarial valuation.
4. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is 71.4%, compared to the prior year's funded ratio of 74.6%. Before reflecting the assumption changes, this year's funded ratio is 72.9%. This ratio is one measure of funding status, and its history is a measure of funding progress. Using the market value of assets, the funded ratio is 69.6%, compared to 70.3% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of Plan assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.
5. The results of this June 30, 2017, actuarial valuation are used to determine the actuarially determined contribution for the fiscal year ending June 30, 2019, and to estimate the actuarially determined contribution for the fiscal year ending June 30, 2020. The actuarially determined contribution for fiscal 2019 is \$62,984,742, an increase of \$10,919,345 from fiscal 2018. The actuarially determined contribution is equal to the Plan's employer normal cost, plus the amount necessary to amortize the unfunded actuarial accrued liability as of June 30, 2017, over a period ending on June 30, 2038, assuming that the amortization period will remain closed and that the amortization amount will increase annually at the rate of 5% over the preceding year.
6. In accordance with section 473, subsection (c)(4), of Title 3, Chapter 16, Subchapter 1, Vermont Statutes Annotated, the 5% factor by which amortization payments are scheduled to increase is set to change to 3% beginning July 1, 2019. This means that, initially, the contribution requirements beginning with the fiscal year ending June 30, 2020, and for several years thereafter will be significantly greater than the requirement for the year ending June 30, 2019. The estimated fiscal 2020 actuarially determined contribution is \$74,038,986.
7. The unfunded actuarial accrued liability is \$717,577,722, which is an increase of \$135,394,123 since the prior valuation.
8. The actuarial loss from investment experience is \$11,338,110.
9. The net experience loss from sources other than investment experience was approximately 3.4% of the actuarial accrued liability prior to reflection of assumption changes. Additional detail regarding this loss is shown in *Section 2, Exhibit C*.

10. The rate of return on the market value of assets was 11.0% for the July 1, 2016 to June 30, 2017 plan year. The return on the actuarial value of assets was 7.3% for the same period due to the recognition of prior year's investment gains and losses. This resulted in an actuarial loss when measured against the assumed rate of return of 7.95% (applicable for the year ending June 30, 2017). Given the low fixed income interest rate environment, target asset allocation and expectations of future investment returns for various classes, the Board lowered the investment return assumption to 7.50% effective for this June 30, 2017 actuarial valuation. We advise the Board to continue to monitor actual and anticipated investment returns relative to the assumed long-term rate of return on investments.
11. The actuarial value of assets is 102.6% of the market value of assets. The investment experience in the past years has only been partially recognized in the actuarial value of assets. As the deferred net loss is recognized in future years, the cost of the Plan is likely to increase unless the net loss is offset by future experience. The recognition of the deferred market losses of \$45,352,439 will also have an impact on the future funded ratio. If the net deferred losses were recognized immediately in the actuarial value of assets, the actuarially determined contribution would increase from 11.44% to about 11.97% of payroll.
12. The following changes in actuarial assumptions were approved by the Board:
  - The investment return assumption was lowered from 7.95% to 7.50%.
  - The inflation assumption was lowered from 3.00% to 2.50%.
  - The COLA assumption was lowered from 3.00% to 2.55% for Group A, C and D members and for Group F members who retired after July 1, 2008, and from 1.50% to 1.40% for all other Group F members.
  - The mortality assumption was updated, as outlined in *Section 4, Exhibit I*.

As a result of these assumption changes, the total normal cost increased by \$3,868,130 and the actuarial accrued liability increased by \$49,130,291. The total impact was an increase in the actuarially determined contribution of \$5,221,248, or 1.0% of payroll.

13. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the Plan's funding policy and measuring the progress of that funding policy. The Net Pension Liability (NPL) and Pension Expense under Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68, for inclusion in the plan and employer's financial statements as of June 30, 2017, and June 30, 2018, will be provided separately. The actuarially determined contribution in this valuation is expected to be used as the actuarially determined contribution (ADC) for GASB financial reporting.
14. This actuarial report as of June 30, 2017, is based on financial and demographic data as of that date. Changes subsequent to that date are not reflected and will affect future actuarial costs of the Plan.

## Summary of Key Valuation Results

		2017	2016*
<b>Actuarially determined employer contributions:</b>	• Actuarially determined employer contributions for fiscal 2019 (and 2018)	\$62,984,742	\$52,065,397
	• Estimated actuarially determined contributions for fiscal 2020 (and 2019)	74,038,986	54,458,100
<b>Actuarial accrued liability for plan year beginning July 1:</b>	• Retired participants and beneficiaries	\$1,459,055,067	\$1,359,390,862
	• Inactive vested participants	41,893,444	37,568,615
	• Active participants	975,037,561	860,688,464
	• Inactive participants due a refund of employee contributions	35,386,383	31,803,599
	• Total	2,511,372,455	2,289,451,540
	• Employer normal cost for plan year beginning July 1	15,835,914	13,572,522
<b>Assets for plan year beginning July 1:</b>	• Market value of assets (MVA)	\$1,748,442,294	\$1,609,650,152
	• Actuarial value of assets (AVA)	1,793,794,733	1,707,267,941
	• Actuarial value of assets as a percentage of market value of assets	102.59%	106.06%
<b>Funded status for plan year beginning July 1:</b>	• Unfunded actuarial accrued liability based on MVA	\$762,930,161	\$679,801,388
	• Funded percentage on MVA basis	69.62%	70.31%
	• Unfunded actuarial accrued liability based on AVA	\$717,577,722	\$582,183,599
	• Funded percentage on AVA basis	71.43%	74.57%
	• Remaining amortization period	21	22
<b>Key assumptions:</b>	• Interest rate	7.50%	7.95%
	• Inflation rate	2.50%	3.00%
<b>Demographic data for plan year beginning July 1:</b>	• Number of retired members and beneficiaries	6,727	6,542
	• Number of vested former members	742	728
	• Number of inactive members entitled to a refund of employee contributions	1,098	1,012
	• Number of active members	8,620	8,436
	• Total payroll	\$504,553,289	\$471,268,111
	• Average payroll	58,533	55,864

\* All valuation results shown throughout this report for June 30, 2016 and prior years and all figures in this column were calculated by the prior actuary, Buck Consultants.

# Important Information About Actuarial Valuations

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

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

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

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

- The actuarial valuation is prepared at the request of the System and Board of Trustees. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the plan's assets and liabilities at a specific date. Accordingly, except where otherwise noted, Segal did not perform an analysis of the potential range of future financial measures. The actual long-term cost of the plan will be determined by the actual benefits and expenses paid and the actual investment experience of the plan.
- Actuarial results in this report are not rounded, but that does not imply precision.
- If the System is aware of any event or trend that was not considered in this valuation that may materially change the results of the valuation, Segal should be advised, so that we can evaluate it.
- Segal does not provide investment, legal, accounting, or tax advice. Segal's valuation is based on our understanding of applicable guidance in these areas and of the plan's provisions, but they may be subject to alternative interpretations. The System should look to its other advisors for expertise in these areas.

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

## Section 2: Actuarial Valuation Results

### A. Membership Data

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

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

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

#### MEMBER POPULATION: 2008 – 2017

As of July 1	Active Members	Vested Terminated Members*	Retired Members and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives
2008	8,442	789	4,555	5,344	0.63
2009	8,095	798	4,797	5,595	0.69
2010	7,782	765	5,201	5,966	0.77
2011	7,768	774	5,375	6,149	0.79
2012	7,878	767	5,600	6,367	0.81
2013	8,158	741	5,795	6,536	0.80
2014	8,325	732	5,980	6,712	0.81
2015	8,446	735	6,204	6,939	0.82
2016	8,436	728	6,542	7,270	0.86
2017	8,620	742	6,727	7,469	0.87

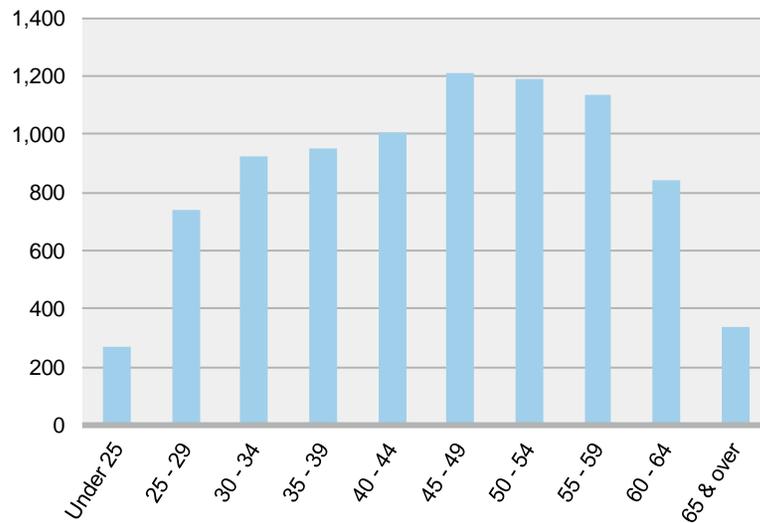
\*Excludes terminated participants due a refund of employee contributions

## Active Members

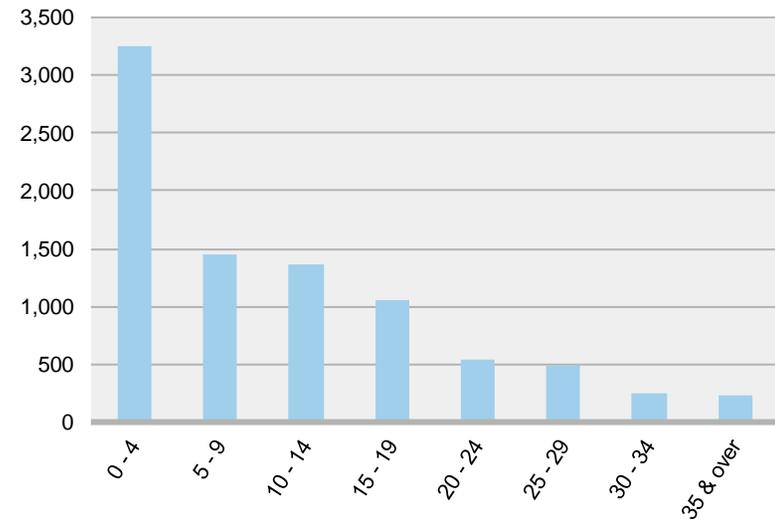
Plan costs are affected by the age, years of creditable service and payroll of active members. In this year's valuation, there were 8,620 active members with an average age of 46.0, average years of creditable service of 11.1 years and average payroll of \$58,533. The 8,436 active members in the prior valuation had an average age of 46.2, average service of 11.3 years and average payroll of \$55,864.

### Distribution of Active Members as of July 1, 2017

#### ACTIVES BY AGE



#### ACTIVES BY YEARS OF CREDITABLE SERVICE



## Inactive Members

In this year's valuation, there were 742 members with a vested right to a deferred or immediate vested benefit.

In addition, there were 1,098 non-vested members entitled to a return of their employee contributions.

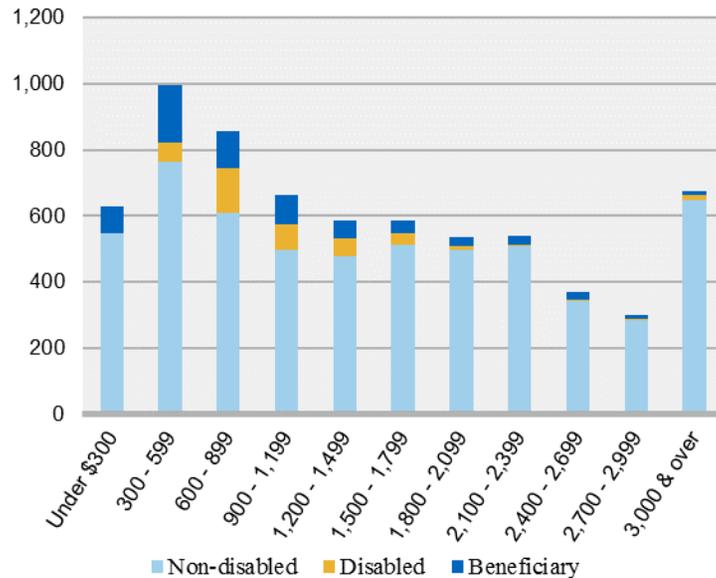
## Retired Members and Beneficiaries

As of June 30, 2017, 6,092 retired members (including disability retirees) and 635 beneficiaries were receiving total monthly benefits of \$10,469,053. For comparison, in the previous valuation, there were 5,858 retired members and 684 beneficiaries receiving monthly benefits of \$9,951,915.

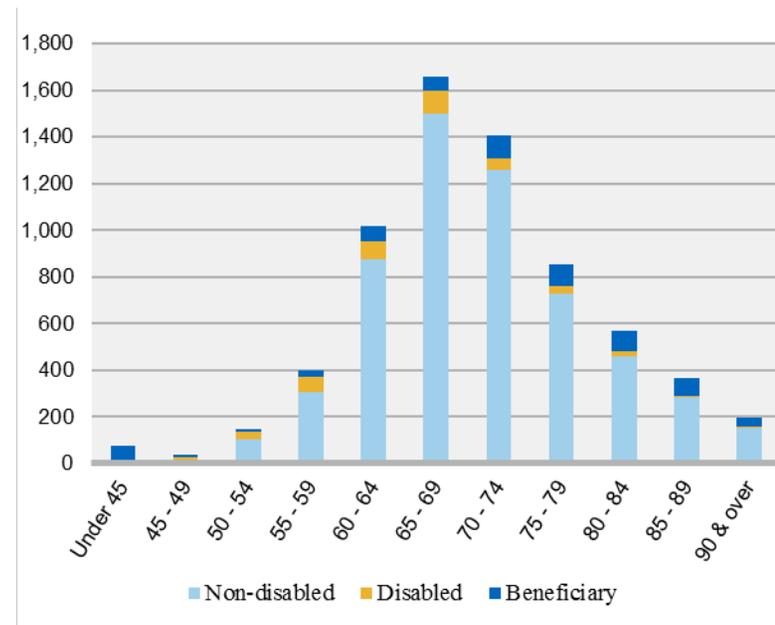
As of June 30, 2017, the average monthly benefit for retired members is \$1,616, compared to \$1,587 in the previous valuation. The average age for retired members is 70.3 in the current valuation, compared with 70.1 in the prior valuation.

### Distribution of Pensioners as of July 1, 2017

**PENSIONERS BY TYPE AND MONTHLY AMOUNT**



**PENSIONERS BY TYPE AND BY AGE**



## Historical Plan Population

The chart below demonstrates the progression of the active population over the last ten years. The chart also shows the growth among the retired population over the same time period.

### MEMBERSHIP DATA STATISTICS: 2008 – 2017

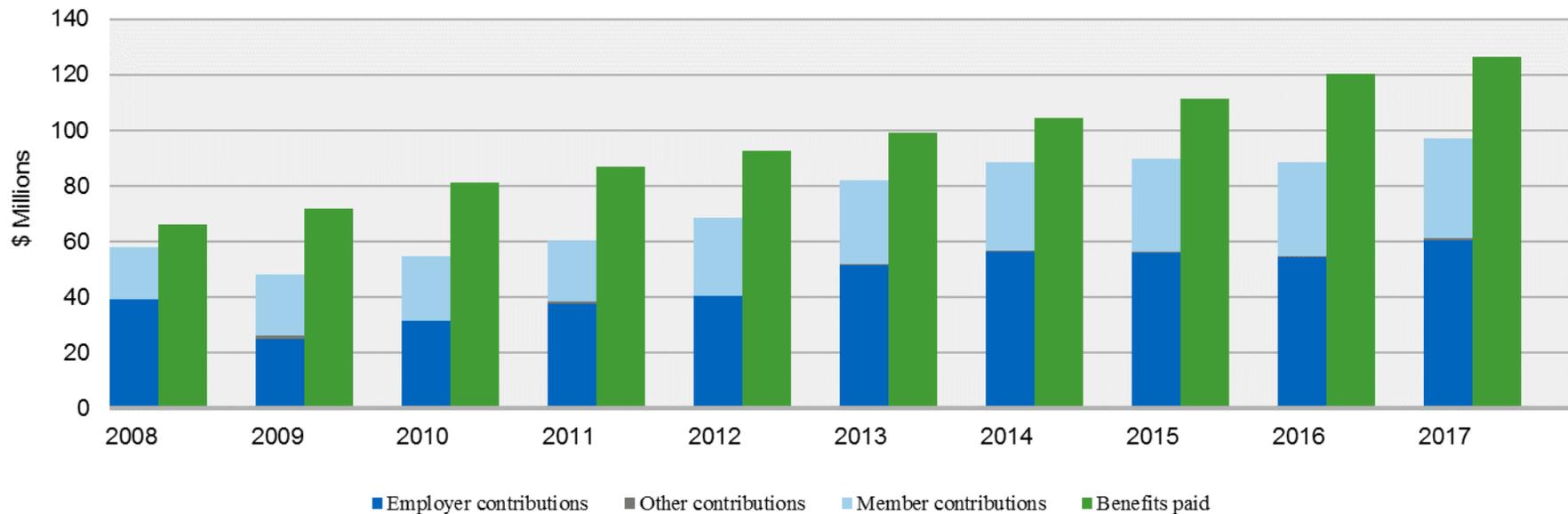
As of July 1	Active Members			Retired Members		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2008	8,442	46.6	12.3	4,035	--	\$1,260
2009	8,095	47.0	12.7	4,262	--	1,332
2010	7,782	47.0	12.6	4,678	--	1,348
2011	7,768	47.0	12.6	4,851	--	1,398
2012	7,878	46.4	12.5	5,060	--	1,450
2013	8,158	46.2	12.2	5,248	--	1,478
2014	8,325	45.2	11.8	5,421	69.7	1,510
2015	8,446	46.5	11.7	5,554	70.0	1,561
2016	8,436	46.2	11.3	5,858	70.1	1,587
2017	8,620	46.0	11.1	6,092	70.3	1,616

## B. Financial Information

Retirement plan funding anticipates that, over the long term, both contributions and investment earnings (less investment fees and administrative expenses) will be needed to cover benefit payments. Retirement plan assets change as a result of the net impact of these income and expense components.

Additional financial information, including a summary of these transactions for the valuation year, is presented in *Section 3, Exhibits C, D and E*.

### COMPARISON OF CONTRIBUTIONS TO BENEFITS PAID FOR YEARS ENDED JUNE 30, 2008 – 2017



It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board has adopted an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuation is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

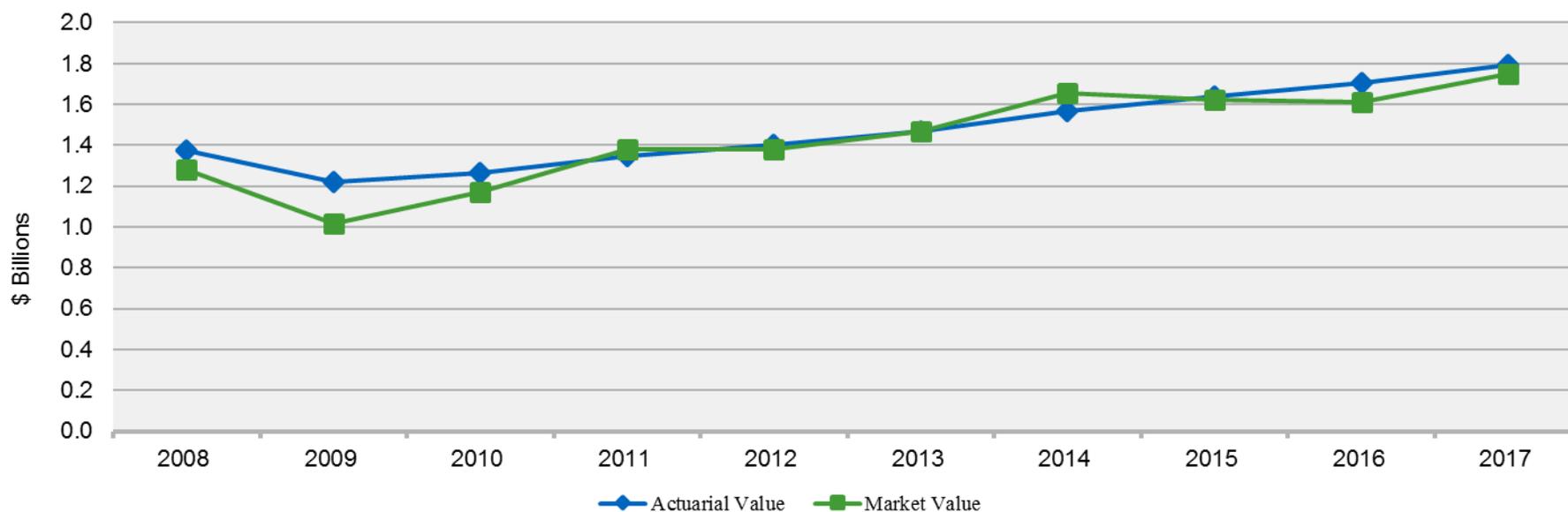
### DETERMINATION OF ACTUARIAL VALUE OF ASSETS FOR YEAR ENDED JUNE 30, 2017

1	Actuarial value of assets, June 30, 2016	\$1,707,267,941
2	Net new money, including expected investment income (7.95%)	97,864,902
3	Preliminary asset value: 1 + 2	1,805,132,843
4	Smoothing adjustment	
	(a) Market value, June 30, 2017	1,748,442,294
	(b) Preliminary asset value	1,805,132,843
	(c) Unrecognized appreciation	-56,690,549
	(d) Adjustment	x 20%
		-11,338,110
5	Actuarial value of assets, June 30, 2017: 3 + 4d	\$1,793,794,733

The assets for valuation purposes are 102.59% of market value.

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

### ACTUARIAL VALUE OF ASSETS VS. MARKET VALUE OF ASSETS AS OF JUNE 30, 2008 – 2017



## C. Actuarial Experience

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

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

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

The net experience loss is \$94,771,548, which includes \$11,338,110 from investment losses and \$83,433,438 in losses from all other sources. The net experience variation from individual sources other than investments was 3.4% of the actuarial accrued liability prior to reflection of the assumption changes. A discussion of the major components of the actuarial experience is on the following pages.

### ACTUARIAL EXPERIENCE FOR YEAR ENDED JUNE 30, 2017

1	Net gain/(loss) from investments*	-\$11,338,110
2	Net gain/(loss) from other experience	-83,433,438
3	Net experience gain/(loss): 1 + 2	-\$94,771,548

\* Details on next page.

## Investment Experience

A major component of projected asset growth is the assumed rate of return. The assumed return should represent the expected long-term rate of return, based on the System's investment policy. The rate of return on the market value of assets was 11.01% for the year ended June 30, 2017.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.95% (changed to 7.50%, effective June 30, 2017). The actual rate of return on an actuarial basis for the 2017 plan year was 7.28%. Since the actual return for the year was less than the assumed return, the Plan experienced an actuarial loss during the year ended June 30, 2017 with regard to its investments.

### INVESTMENT EXPERIENCE

	Year Ended June 30, 2017	
	Market Value	Actuarial Value
1 Investment income	\$175,207,530	\$122,942,180
2 Average value of assets	1,591,442,458	1,689,060,247
3 Rate of return: $1 \div 2$	11.01%	7.28%
4 Assumed rate of return	7.95%	7.95%
5 Expected investment income: $2 \times 4$	\$126,519,675	\$134,280,290
6 Actuarial gain/(loss): $1 - 5$	<u>\$48,687,855</u>	<u>-\$11,338,110</u>

Because actuarial planning is long term, it is useful to see how the assumed investment rate of return has followed actual experience over time. The table below shows the rate of return on an actuarial basis compared to the market value investment return for the last 20 years, including averages over select time periods.

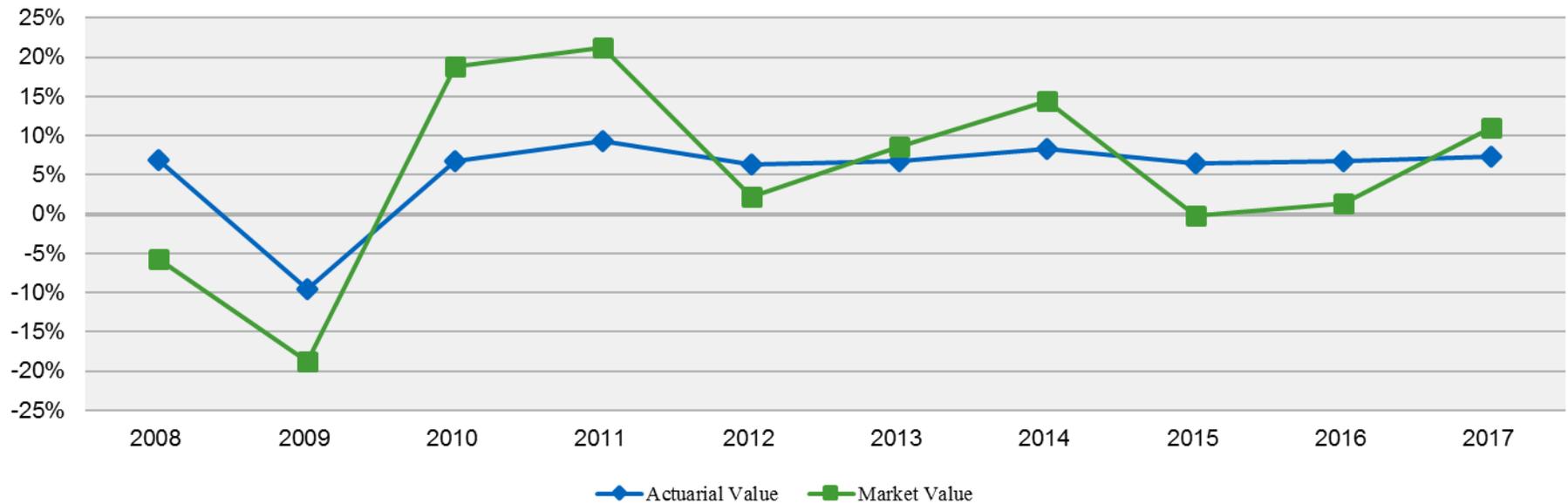
### INVESTMENT RETURN – ACTUARIAL VALUE VS. MARKET VALUE: 1998 - 2017

Year Ended June 30	Actuarial Value Investment Return		Market Value Investment Return		Year Ended June 30	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent
1998	\$103,216,071	16.26%	\$144,480,676	18.65%	2008	\$89,281,830	6.85%	-\$78,966,292	-5.74%
1999	105,789,263	14.77	83,345,613	9.28	2009	-130,060,430	-9.55	-238,392,427	-18.80
2000	113,086,381	14.25	117,824,509	12.37	2010	80,550,116	6.71	187,930,419	18.82
2001	89,249,154	10.14	-66,366,171	-6.36	2011	116,660,083	9.34	244,063,320	21.16
2002	57,320,146	6.07	-49,030,960	-5.15	2012	83,600,231	6.27	29,466,721	2.16
2003	55,169,045	5.63	45,639,510	5.17	2013	93,222,330	6.71	116,835,891	8.55
2004	75,261,848	7.41	142,588,476	15.70	2014	120,645,037	8.28	210,491,370	14.43
2005	84,075,397	7.83	95,845,599	9.28	2015	100,145,920	6.46	-2,430,832	-0.15
2006	94,266,315	8.28	119,220,681	10.74	2016	108,862,988	6.73	22,651,623	1.41
2007	94,266,315	9.93	197,642,924	16.37	2017	122,942,180	7.28	175,207,530	11.01
							Most recent five-year average return	7.09%	6.82%
							Most recent ten-year average return	5.55%	4.82%
							Most recent 15-year average return	6.21%	6.68%
							Most recent 20-year average return	7.15%	6.35%

Note: Each year's yield is weighted by the average asset value in that year.

Subsection B described the actuarial asset valuation method that gradually recognizes fluctuations in the market value rate of return. The goal of this is to stabilize the actuarial rate of return and to produce more level pension plan costs.

### MARKET AND ACTUARIAL RATES OF RETURN FOR YEARS ENDED JUNE 30, 2008 - 2017



## Administrative Expenses

Administrative expenses for the System are paid by the State.

## Other Experience

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

- the extent of turnover among participants,
- retirement experience (earlier or later than projected),
- mortality (more or fewer deaths than projected),
- the number of disability retirements (more or fewer than projected),
- actual COLAs paid (more or less than assumed), and
- salary increases (greater or smaller than projected).

The net loss from this other experience for the year ended June 30, 2017, amounted to \$83,433,438, which is 3.4% of the actuarial accrued liability prior to reflection of the assumption changes.

### EXPERIENCE GAIN/(LOSS) DUE TO CHANGES IN DEMOGRAPHICS FOR YEAR ENDED JUNE 30, 2017

Net turnover	-\$13,064,871
Retirement	-12,223,344
Mortality	-9,160,867
Disability retirements	-1,124,342
Salary increase for continuing actives	-14,254,036
COLA experience	15,467,145
Miscellaneous/methodology differences	<u>-49,073,123</u>
<b>Total</b>	<b>-<u>\$83,433,438</u></b>

## D. Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of June 30, 2017 is \$2,511,372,455, an increase of \$221,920,915, or 9.7%, from the actuarial accrued liability as of the prior valuation date.

### Actuarial Assumptions

- The assumption changes reflected in this report are:
  - The investment return assumption was lowered from 7.95% to 7.50%.
  - The inflation assumption was lowered from 3.00% to 2.50%.
  - The COLA assumption was lowered from 3.00% to 2.55% for Group A, C and D members and for Group F members who retired after July 1, 2008, and from 1.50% to 1.40% for all other Group F members.
  - The mortality assumption for healthy participants was updated as follows:
    - Groups A and F – 101% of the RP-2014 tables, blended 30% Blue Collar and 70% Healthy, with generational projection using Scale SSA-2017;
    - Group C – 100% of the RP-2014 Blue Collar tables with generational projection using Scale SSA-2017;
    - Group D – 100% of the RP-2014 Healthy tables with generational projection using Scale SSA-2017.
  - The mortality assumption for disability retirees was updated to the RP-2014 Disabled Mortality Table with generational projection using Scale SSA-2017.
- These changes increased the actuarial accrued liability by 2.0% and increased the total normal cost by 8.1%.
- Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

### Plan Provisions

- There were no changes in plan provisions since the prior valuation.
- A summary of plan provisions is in *Section 4, Exhibit II*.

## E. Development of Unfunded Actuarial Accrued Liability

### DEVELOPMENT OF UNFUNDED ACTUARIAL ACCRUED LIABILITY FOR YEAR ENDED JUNE 30, 2017

1	Unfunded actuarial accrued liability at beginning of year	\$582,183,599
2	Normal cost at beginning of year	42,703,770
3	Total contributions	-97,032,971
4	Interest	
	• For whole year on 1 + 2	\$49,678,546
	• For half year on 3	<u>-3,857,061</u>
	Total interest	<u>45,821,485</u>
5	Expected unfunded actuarial accrued liability	\$573,675,883
6	Changes due to:	
	• (Gain)/loss	94,771,548
	• Assumptions	49,130,291
	• Funding method	0
	• Plan provisions	<u>0</u>
	Total changes	<u>\$143,901,839</u>
7	Unfunded actuarial accrued liability at end of year	<u>\$717,577,722</u>

## F. Actuarially Determined Contribution

The actuarially determined contribution is equal to the employer normal cost payment and a payment on the unfunded actuarial accrued liability. The statute governing the System specifies the funding policy used to calculate the actuarially determined contribution based on a closed amortization period ending on June 30, 2038. As of July 1, 2017, there are 21 years remaining on this schedule.

The actuarially determined contribution for the fiscal year ending June 30, 2018, is \$52,065,397 as determined with the June 30, 2016, actuarial valuation. The results of this June 30, 2017, actuarial valuation are used to determine the actuarially determined contribution for the fiscal year ending June 30, 2019, and to estimate the actuarially determined contribution for the fiscal year ending June 30, 2020.

The preliminary contribution requirement as of July 1, 2017, is based on the data previously described, the actuarial assumptions and Plan provisions described in *Section 4*, including all changes affecting future costs adopted at the time of the actuarial valuation, actuarial gains and losses, and changes in the actuarial assumptions.

### PRELIMINARY CONTRIBUTION REQUIREMENT

	Year Beginning July 1			
	2017		2016	
	Amount	% of Payroll	Amount	% of Payroll
1 Total normal cost, adjusted for timing*	\$51,569,137	9.80%	\$44,368,785	9.41%
2 Expected employee contributions	<u>-35,733,223</u>	<u>-6.79%</u>	<u>-30,796,263</u>	<u>-6.53%</u>
3 Employer normal cost: 1 + 2	15,835,914	3.01%	13,572,522	2.88%
4 Actuarial accrued liability	2,511,372,455		2,289,451,540	
5 Actuarial value of assets	1,793,794,733		1,707,267,941	
6 Unfunded actuarial accrued liability: 4 - 5	717,577,722		582,183,599	
7 Payment on unfunded actuarial accrued liability, adjusted for timing*	44,375,782	8.43%	36,216,746	7.68%
8 Preliminary contribution requirement: 3 + 7	<u>\$60,211,696</u>	<u>11.44%</u>	<u>\$49,789,268</u>	<u>10.56%</u>
9 Projected payroll	\$526,438,659		\$471,268,111	

\*Contributions are assumed to be paid at the middle of the year.

## Reconciliation of Preliminary Contribution Requirement

The chart below details the changes in the preliminary contribution requirement from the prior valuation to the current year's valuation.

### RECONCILIATION OF PRELIMINARY CONTRIBUTION REQUIREMENT FROM JULY 1, 2016 TO JULY 1, 2017

	Amount	% of Payroll
Preliminary contribution requirement as of July 1, 2016	\$49,789,268	10.56%
Effect of:		
• Plan amendment(s)	0	0.00%
• Change in asset method	0	0.00%
• Expected change in amortization payment due to payroll growth	1,810,837	0.34%
• Change in amortization period	0	0.00%
• Change in actuarial assumptions	5,221,248	0.99%
• Contributions (more)/less than actuarially determined contribution	-1,104,613	-0.21%
• Investment (gain)/loss	729,744	0.14%
• Other gains and losses on accrued liability	5,369,949	1.02%
• Net effect of other changes, including composition and number of participants, payroll	-1,604,737	-1.40%
Total change	10,422,428	0.88%
Preliminary contribution requirement as of July 1, 2017	\$60,211,696	11.44%

## G. Amortization Schedule for Unfunded Actuarial Accrued Liability

A schedule of projected future unfunded actuarial accrued liability payments is shown below.

### UNFUNDED LIABILITY AMORTIZATION SCHEDULE

As of June 30	Balance	Amortization Payment (Year Following)
2017	\$717,577,722	\$44,375,782
2018	725,386,261	46,594,571
2019	731,479,951	57,075,159*
2020	727,164,163	58,787,414
2021	720,749,387	60,551,037
2022	712,024,940	62,367,568
2023	700,762,740	64,238,595
2024	686,715,952	66,165,753
2025	669,617,537	68,150,725
2026	649,178,676	70,195,247
2027	625,087,096	72,301,104
2028	597,005,248	74,470,137
2029	564,568,359	76,704,242
2030	527,382,336	79,005,369
2031	485,021,501	81,375,530
2032	437,026,169	83,816,796
2033	382,900,028	86,331,300
2034	322,107,334	88,921,239
2035	254,069,881	91,588,876
2036	178,163,755	94,336,542
2037	93,715,828	97,166,638
2038	0	0

\* Beginning July 1, 2019 and each year thereafter, the annual payment to amortize the unfunded actuarial liability will be calculated based upon installments increasing at a rate of 3% per year instead of 5%.

## H. Actuarially Determined Contribution for Following Two Fiscal Years

On the basis of the June 30, 2017, actuarial valuation, the employer normal cost rate is 3.01%. This rate is applied to the projected payrolls for fiscal 2019 and fiscal 2020 to determine the employer normal cost for each year. The payment on the unfunded liability is added to the employer normal cost to determine the actuarially determined contribution for the fiscal year ending June 30, 2019, and to estimate the actuarially determined contribution for the fiscal year ending June 30, 2020, as shown below. The final actuarially determined contribution for fiscal 2020 will be determined with the next valuation.

### ACTUARIALLY DETERMINED CONTRIBUTION: 2019 – 2020

Fiscal Year Ended June 30	Projected Payroll*	Normal Cost Rate	Projected Contributions		
			Normal Cost	Unfunded Liability	Total
2019	\$544,864,012	3.01%	\$16,390,171	\$46,594,571	\$62,984,742
2020	563,934,252	3.01%	16,963,827	57,075,159	74,038,986

\* In these projections, total payroll is assumed to increase by 3.5% each year.

## I. History of Employer Contributions

A history of the most recent years of contributions is shown below.

### HISTORY OF EMPLOYER CONTRIBUTIONS: 2009 – 2018

Fiscal Year Ended June 30	Actuarially Determined Employer Contribution		Actual Employer Contribution		Percent Contributed
	Amount*	Percentage of Payroll**	Amount	Percentage of Payroll**	
2009	\$25,333,307	6.27%	\$25,134,235	6.22%	99.21%
2010	32,013,894	7.57%	31,468,884	7.44%	98.30%
2011	41,581,656	9.84%	37,572,599	8.89%	90.36%
2012	36,587,864	8.89%	40,302,433	9.79%	110.15%
2013	37,081,933	8.91%	51,370,307	12.34%	138.53%
2014	40,217,666	9.98%	56,482,985	14.02%	140.44%
2015	44,651,783	10.25%	55,881,364	12.83%	125.15%
2016	46,237,853	10.11%	54,347,060	11.88%	117.54%
2017	48,503,358	10.14%	60,280,480	12.60%	124.28%
2018	52,065,397	10.67%	--	--	--

\* Budgeted contribution amount from prior valuation

\*\*Based on expected payroll

## J. Actuarial Balance Sheet

An overview of the Plan’s funding is provided by an Actuarial Balance Sheet, which compares the total liabilities (current and future) to the total assets (current and future). The liabilities are calculated by determining the amount and timing of all future payments that will be made by the Plan for current participants. These payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value of all benefits, referred to as the “liability” of the Plan.

Second, this liability is compared to the assets. The “assets” for this purpose include the net amount of assets already accumulated by the Plan, the present value of future member contributions, the present value of future employer normal cost contributions, and the present value of future employer amortization payments for the unfunded actuarial accrued liability.

### ACTUARIAL BALANCE SHEET

	Year Ended	
	June 30, 2017	June 30, 2016
<b>Liabilities</b>		
• Present value of benefits for retired participants and beneficiaries	\$1,459,055,067	\$1,359,390,862
• Present value of benefits for inactive former participants	77,279,827	69,372,214
• Present value of benefits for active participants	<u>1,381,612,843</u>	<u>1,204,782,290</u>
<b>Total liabilities</b>	<b>\$2,917,947,737</b>	<b>\$2,633,545,366</b>
<b>Assets</b>		
• Total valuation value of assets	\$1,793,794,733	\$1,707,267,941
• Present value of future contributions by members	313,920,542	257,401,176
• Present value of future employer contributions for:		
» Entry age cost	92,654,740	86,692,650
» Unfunded actuarial accrued liability	<u>717,577,722</u>	<u>582,183,599</u>
<b>Total of current and future assets</b>	<b><u>\$2,917,947,737</u></b>	<b><u>\$2,633,545,366</u></b>

## Section 3: Supplemental Information

### EXHIBIT A – TABLE OF PLAN COVERAGE

Category	As of July 1		Change From Prior Year
	2017*	2016	
<b>Active members in valuation:</b>			
• Number	8,620	8,436	2.2%
• Average age	46.0	46.2	-0.2
• Average years of creditable service	11.1	11.3	-0.2
• Total payroll	\$504,553,289	\$471,268,111	7.1%
• Average payroll	58,533	55,864	4.8%
• Total active vested members	5,367	5,285	2.4%
<b>Inactive members:</b>			
• Number of terminated vested	742	728	1.9%
• Number of other non-vested inactives	1,098	1,012	8.5%
<b>Retired members:</b>			
• Number in pay status	5,680	5,473	3.8%
• Average age	70.7	70.5	0.2
• Average monthly benefit	\$1,650	\$1,621	1.8%
<b>Disability retirees:</b>			
• Number in pay status	412	385	7.0%
• Average age	64.7	64.3	0.4
• Average monthly benefit	\$1,146	\$1,112	3.1%
<b>Beneficiaries:</b>			
• Number in pay status	635	684	-7.2%
• Average age	68.3	68.7	-0.4
• Average monthly benefit	\$987	\$955	3.4%

\*In 2017, QDROs were included in the retired participant counts rather than the beneficiary counts.

## EXHIBIT B – RECONCILIATION OF MEMBERSHIP DATA

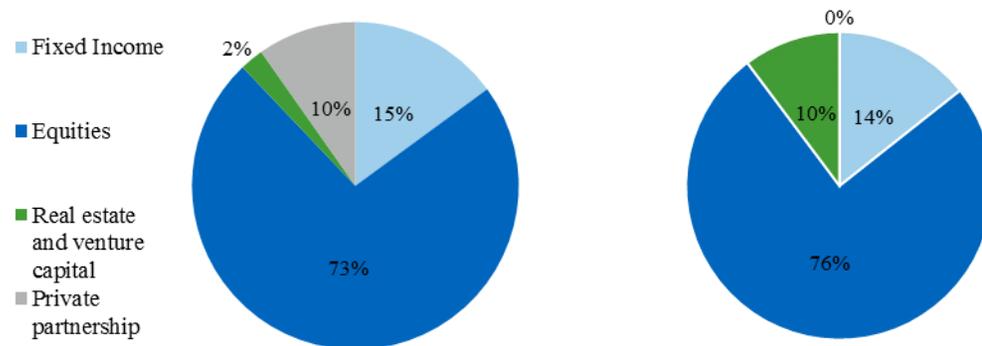
	Active Members	Vested Terminated Members	Non-vested Members	Disability Retirees	Retired Members	Beneficiaries	Total
<b>Number as of July 1, 2016</b>	<b>8,436</b>	<b>728</b>	<b>1,012</b>	<b>385</b>	<b>5,473</b>	<b>684</b>	<b>16,718</b>
• New participants	910	N/A	0	N/A	N/A	N/A	910
• Terminations – with vested rights	0	0	0	0	0	0	0
• Terminations – without vested rights	-344	N/A	344	N/A	N/A	N/A	0
• Retirements	-249	-38	0	N/A	287	N/A	0
• New disabilities	-19	0	0	19	N/A	N/A	0
• Return to work	0	0	0	0	0	N/A	0
• Died with beneficiary	-5	0	0	-2	-37	44	0
• Died without beneficiary	-4	-2	-4	-12	-101	-34	-157
• Lump sum cash-outs	-139	-9	-259	0	0	0	-407
• Rehire	34	-5	-29	N/A	0	N/A	0
• Certain period expired	N/A	N/A	0	0	0	-9	-9
• Data adjustments	0	68	34	22	58	-50	132
<b>Number as of July 1, 2017</b>	<b>8,620</b>	<b>742</b>	<b>1,098</b>	<b>412</b>	<b>5,680</b>	<b>635</b>	<b>17,187</b>

## EXHIBIT C – SUMMARY STATEMENT OF INCOME AND EXPENSES ON A MARKET VALUE BASIS

	Year Ended June 30, 2017	Year Ended June 30, 2016
Net assets at market value at the beginning of the year	\$1,609,650,152	\$1,624,861,239
<b>Contribution income:</b>		
• Employer contributions	\$60,280,480	\$54,347,060
• Member contributions	35,966,987	34,055,217
• Less administrative expenses	<u>-2,119,044</u>	<u>-1,775,647</u>
<i>Net contribution income</i>	<i>\$94,128,423</i>	<i>\$86,626,630</i>
Net other income	\$785,504	\$293,444
<b>Investment income:</b>		
• Interest, dividends and other income	\$25,832,143	\$14,885,965
• Asset appreciation	149,375,387	76,251,898
• Income from pooled investments	0	-68,486,239
• Less investment fees	<u>-4,849,514</u>	<u>-4,689,199</u>
<i>Net investment income</i>	<i><u>\$170,358,016</u></i>	<i><u>\$17,962,425</u></i>
<b>Total income available for benefits</b>	<b>\$265,271,943</b>	<b>\$104,882,499</b>
<b>Less benefit payments:</b>		
• Benefits	-\$122,139,440	-\$115,880,147
• Refunds of contributions	-3,640,086	-3,320,185
• Death claims	-392,819	-334,702
• Transfers to other pension trust funds	<u>-307,456</u>	<u>-558,552</u>
<i>Net benefit payments</i>	<i>-\$126,479,801</i>	<i>-\$120,093,586</i>
<b>Change in reserve for future benefits</b>	<b>\$138,792,142</b>	<b>-\$15,211,087</b>
<b>Net assets at market value at the end of the year</b>	<b>\$1,748,442,294</b>	<b>\$1,609,650,152</b>

## EXHIBIT D – SUMMARY STATEMENT OF PLAN ASSETS

	June 30 , 2017	June 30, 2016
Cash equivalents	\$54,322,860	\$21,054,202
Total accounts receivable	95,264,034	57,799,411
Prepaid expenses	37,519	36,479
Capital assets, net of depreciation	1,838,117	2,178,367
<b>Investments:</b>		
• Fixed Income	\$256,421,944	\$231,397,946
• Equities	316,808,823	268,604,643
• Private partnerships	167,474,960	0
• Mutual and commingled funds	933,509,690	946,085,568
• Real estate and venture capital	<u>40,319,231</u>	<u>165,257,077</u>
Total investments at market value	\$1,714,534,648	\$1,611,345,234
Total assets	\$1,865,997,178	\$1,692,413,693
Total liabilities	-117,554,884	-82,763,541
<b>Net assets at market value</b>	<b>\$1,748,442,294</b>	<b>\$1,609,650,152</b>
<b>Net assets at actuarial value</b>	<b>\$1,793,792,981</b>	<b>\$1,707,267,941</b>



## EXHIBIT E – DEVELOPMENT OF THE FUND THROUGH JUNE 30, 2017

Year Ended June 30	Employer Contributions	Member Contributions	Net Other Income	Net Investment Return*	Admin. Expenses**	Benefit Payments***	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2007							\$1,392,327,497	\$1,318,686,944	94.71%
2008	\$39,179,823	\$18,614,102	\$169,984	-\$84,065,601	-\$17,625,950	-\$66,105,953	1,282,493,872	1,377,101,471	107.38%
2009	25,134,235	22,148,754	1,041,870	-242,976,382	-1,219,287	-71,925,080	1,014,697,982	1,217,637,578	120.00%
2010	31,468,884	22,840,354	227,524	182,593,261	-891,477	-81,091,626	1,169,844,902	1,265,404,195	108.17%
2011	37,572,599	22,269,041	743,172	238,386,383	-1,147,576	-87,061,787	1,380,606,734	1,348,762,790	97.69%
2012	40,302,433	27,708,009	377,562	23,604,774	-1,328,919	-92,781,097	1,378,489,496	1,400,779,062	101.62%
2013	51,370,307	29,847,352	638,436	110,717,567	-1,374,643	-99,194,618	1,470,493,897	1,469,169,902	99.91%
2014	56,482,985	31,745,692	453,852	203,720,178	-1,158,183	-104,492,553	1,657,245,868	1,566,075,540	94.50%
2015	55,881,364	33,296,248	423,273	-8,484,694	-2,104,636	-111,396,184	1,624,861,239	1,636,267,663	100.70%
2016	54,347,060	34,055,217	293,444	17,962,425	-1,775,647	-120,093,586	1,609,650,152	1,707,267,941	106.06%
2017	60,280,480	35,966,987	785,504	170,358,016	-2,119,044	-126,479,801	1,748,442,294	1,793,794,733	102.59%

\* On a market basis, net of investment fees

\*\* Includes depreciation and health/life insurance (2008 and prior)

\*\*\* Includes "other expenses"

## EXHIBIT F – DEFINITION OF PENSION TERMS

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

<b>Actuarial Accrued Liability for Actives:</b>	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
<b>Actuarial Accrued Liability for Pensioners:</b>	The single-sum value of lifetime benefits to existing pensioners. This sum takes into account life expectancies appropriate to the ages of the pensioners and the interest that the sum is expected to earn before it is entirely paid out in benefits.
<b>Actuarial Cost Method:</b>	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.
<b>Actuarial Gain or Loss:</b>	A measure of the difference between actual experience and expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge that may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., assets earn more than projected, salary increases are less than assumed, members retire later than assumed, etc. Favorable experience means actual results produce actuarial liabilities not as large as projected by the actuarial assumptions. On the other hand, actuarial losses are the result of unfavorable experience, i.e., actual results yield actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
<b>Actuarially Equivalent:</b>	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
<b>Actuarial Present Value (APV):</b>	<p>The value of an amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. Each such amount or series of amounts is:</p> <ul style="list-style-type: none"> <li>Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.)</li> <li>Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and</li> <li>Discounted according to an assumed rate (or rates) of return to reflect the time value of money.</li> </ul>

<b>Actuarial Present Value of Future Plan Benefits:</b>	The Actuarial Present Value of benefit amounts expected to be paid at various future times under a particular set of Actuarial Assumptions, taking into account such items as the effect of advancement in age, anticipated future compensation, and future service credits. The Actuarial Present Value of Future Plan Benefits includes the liabilities for active members, retired members, beneficiaries receiving benefits, and inactive members entitled to either a refund or a future retirement benefit. Expressed another way, it is the value that would have to be invested on the valuation date so that the amount invested plus investment earnings would provide sufficient assets to pay all projected benefits and expenses when due.
<b>Actuarial Valuation:</b>	The determination, as of a valuation date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets, and related Actuarial Present Values for a plan. An Actuarial Valuation for a governmental retirement system typically also includes calculations of items needed for compliance with GASB, such as the Actuarially Determined Contribution (ADC) and the Net Pension Liability (NPL).
<b>Actuarial Value of Assets (AVA):</b>	The value of the Fund's assets as of a given date, used by the actuary for valuation purposes. This may be the market or fair value of plan assets, but commonly plans use a smoothed value in order to reduce the year-to-year volatility of calculated results, such as the funded ratio and the ADC.
<b>Actuarially Determined:</b>	Values that have been determined utilizing the principles of actuarial science. An actuarially determined value is derived by application of the appropriate actuarial assumptions to specified values determined by provisions of the law.
<b>Actuarially Determined Contribution (ADC):</b>	The employer's periodic required contributions, expressed as a dollar amount or a percentage of covered plan compensation, determined under the Plan's funding policy. The ADC consists of the Employer Normal Cost and the Amortization Payment.
<b>Amortization Method:</b>	A method for determining the Amortization Payment. The most common methods used are level dollar and level percentage of payroll. Under the Level Dollar method, the Amortization Payment is one of a stream of payments, all equal, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the Amortization Payment is one of a stream of increasing payments, whose Actuarial Present Value is equal to the UAAL. Under the Level Percentage of Pay method, the stream of payments increases at the assumed rate at which total covered payroll of all active members will increase.
<b>Amortization Payment:</b>	The portion of the pension plan contribution, or ADC, that is designed to pay interest on and to amortize the Unfunded Actuarial Accrued Liability.
<b>Assumptions or Actuarial Assumptions:</b>	The estimates upon which the cost of the Fund is calculated, including: <u>Investment return</u> - the rate of investment yield that the Fund will earn over the long-term future;

	<p><u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates;</p> <p><u>Retirement rates</u> - the rate or probability of retirement at a given age;</p> <p><u>Withdrawal rates</u> - the rates at which employees of various ages are expected to leave employment for reasons other than death, disability, or retirement;</p> <p><u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.</p>
<b>Closed Amortization Period:</b>	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period.
<b>Decrements:</b>	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
<b>Defined Benefit Plan:</b>	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
<b>Defined Contribution Plan:</b>	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
<b>Employer Normal Cost:</b>	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
<b>Experience Study:</b>	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more Actuarial Assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
<b>Funded Ratio:</b>	The ratio of the Actuarial Value of Assets (AVA) to the Actuarial Accrued Liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.
<b>GASB 67 and GASB 68:</b>	Governmental Accounting Standards Board (GASB) Statements No. 67 and No. 68. These are the governmental accounting standards that set the accounting rules for public retirement systems and the employers that sponsor or contribute to them. Statement No. 68 sets the accounting rules for the employers that sponsor or contribute to public retirement systems, while Statement No. 67 sets the rules for the systems themselves.
<b>Investment Return:</b>	The rate of earnings of the Fund from its investments, including interest, dividends and capital gain and loss adjustments, computed as a percentage of the average value of the

	fund. For actuarial purposes, the investment return often reflects a smoothing of the capital gains and losses to avoid significant swings in the value of assets from one year to the next.
<b>Net Pension Liability (NPL):</b>	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
<b>Normal Cost:</b>	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment with respect to an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
<b>Open Amortization Period:</b>	An open amortization period is one that is used to determine the Amortization Payment, but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period with level percentage of payroll is used to amortize the Unfunded Actuarial Accrued Liability, the UAAL will never decrease, but will become smaller each year, in relation to covered payroll, if the Actuarial Assumptions are realized.
<b>Plan Fiduciary Net Position:</b>	Market value of assets.
<b>Total Pension Liability (TPL):</b>	The actuarial accrued liability under the entry age normal cost method and based on the blended discount rate as described in GASB 67 and 68.
<b>Unfunded Actuarial Accrued Liability (UAAL):</b>	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
<b>Valuation Date or Actuarial Valuation Date:</b>	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

## Section 4: Actuarial Valuation Basis

### EXHIBIT I – ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

<b>Rationale for Assumptions:</b>	The information and analysis used in selecting each assumption (except for economic assumptions and mortality tables) that has a significant effect on this actuarial valuation is shown in the Actuarial Experience Study dated October 29, 2015 (as prepared by Buck Consultants). Economic assumptions, including inflation, investment return, and assumed cost-of-living adjustment increases were studied and adopted by the Board on July 13, 2017. Mortality table assumptions were studied and adopted by the Board on September 25, 2017.																			
<b>Inflation:</b>	2.50%.																			
<b>Investment Return:</b>	7.50%. The investment return assumption is a long-term estimate derived from historical data, current and recent market expectations, and professional judgment. As part of the analysis, a building block approach was used that reflects inflation expectations and anticipated risk premiums for each of the portfolio's asset classes, as well as the Plan's target asset allocation.																			
<b>Salary Increases:</b>	<table border="1"> <thead> <tr> <th data-bbox="632 870 884 987">Age</th> <th data-bbox="884 870 1094 987">Annual Rate of Salary Increase (%)</th> </tr> </thead> <tbody> <tr> <td data-bbox="632 987 884 1032">25</td> <td data-bbox="884 987 1094 1032">6.21%</td> </tr> <tr> <td data-bbox="632 1032 884 1078">30</td> <td data-bbox="884 1032 1094 1078">5.66%</td> </tr> <tr> <td data-bbox="632 1078 884 1123">35</td> <td data-bbox="884 1078 1094 1123">5.26%</td> </tr> <tr> <td data-bbox="632 1123 884 1169">40</td> <td data-bbox="884 1123 1094 1169">4.92%</td> </tr> <tr> <td data-bbox="632 1169 884 1214">45</td> <td data-bbox="884 1169 1094 1214">4.36%</td> </tr> <tr> <td data-bbox="632 1214 884 1260">50</td> <td data-bbox="884 1214 1094 1260">3.70%</td> </tr> <tr> <td data-bbox="632 1260 884 1305">55</td> <td data-bbox="884 1260 1094 1305">3.50%</td> </tr> <tr> <td data-bbox="632 1305 884 1351">60</td> <td data-bbox="884 1305 1094 1351">3.50%</td> </tr> </tbody> </table>		Age	Annual Rate of Salary Increase (%)	25	6.21%	30	5.66%	35	5.26%	40	4.92%	45	4.36%	50	3.70%	55	3.50%	60	3.50%
Age	Annual Rate of Salary Increase (%)																			
25	6.21%																			
30	5.66%																			
35	5.26%																			
40	4.92%																			
45	4.36%																			
50	3.70%																			
55	3.50%																			
60	3.50%																			

**Cost-of-Living Adjustments:**

Assumed to occur at the rate of 2.55% per annum for Groups A, C and D members and 1.40% per annum for Group F members (beginning at age 62 for deferred retirements). For Group F members retiring after July 1, 2009, cost-of-living adjustments are assumed to occur at the rate of 2.55% per annum effective January 1, 2014.

**Mortality Rates:***Death in Active Service:*

- Groups A/F 101% of RP-2014 blended 30% Blue Collar Employee, 70% Healthy Employee with generational projection using Scale SSA-2017.
- Group C RP-2014 Blue Collar Employee with generational projection using Scale SSA-2017.
- Group D\* RP-2014 Healthy Employee with generational projection using Scale SSA-2017.

*Healthy Post-retirement:*

- Groups A/F projection 101% of RP-2014 blended 30% Blue Collar Annuitant, 70% Healthy Annuitant with generational projection using Scale SSA-2017.
- Group C RP-2014 Blue Collar Annuitant with generational projection using Scale SSA-2017.
- Group D RP-2014 Healthy Annuitant with generational projection using Scale SSA-2017.

*Disabled Post-retirement:*

- All Groups RP-2014 Disabled Mortality Table with generational projection using Scale SSA-2017.

The tables with the generational projection to the ages of participants as of the measurement date reasonably reflect the mortality experience of the Plan as of the measurement date.

The mortality rates were based on historical and current demographic data, adjusted to reflect health characteristics of the various industries and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual amount of deaths by benefit amount and the projected amount based on the prior assumption over the five-year period ending June 30, 2016. The mortality tables were then adjusted to future years using a generational projection with Scale SSA-2017 to reflect future mortality improvement

\* 30% of deaths are assumed to be accidental.

**Separation from Service before Retirement (Due to Withdrawal and Disability):**

Representative values of the assumed annual rates of withdrawal and disability are as follows:

Age	Rate (%)				
	Withdrawal <sup>1</sup>			Disability	
	Groups A/D/F	Group C		Groups A/D/F	Group C
	Male/Female	Male	Female		
25	4.91%	4.32%	8.64%	0.02%	0.08%
30	3.93	4.32	8.64	0.02	0.10
35	3.28	4.32	8.64	0.03	0.13
40	3.04	N/A	N/A	0.04	0.20
45	2.69	N/A	N/A	0.06	0.32
50	2.25	N/A	N/A	0.10	0.55
55	1.83	N/A	N/A	0.18	0.91
60	3.90	N/A	N/A	0.28	1.46

<sup>1</sup> Withdrawal rates are increased during the first 10 years of service.

**Retirement Rates:**

Age	Retirement Group F <sup>2</sup>				
	Male	Female	Age	Male	Female
50	16.0%	6.0%	60	5.6%	5.6%
51	16.0	8.0	61	11.2	11.2
52	8.0	9.0	62	22.4	22.4
53	8.0	9.0	63	17.5	14.0
54	8.0	10.0	64	17.5	14.0
55	4.0	5.0	65	25.0	20.0
56	3.4	4.2	66	15.0	15.0
57	4.5	5.6	67	17.5	17.5
58	5.0	6.3	68	17.5	17.5
59	5.6	5.6	69	20.0	20.0
			70	100.0	100.0

<sup>2</sup> All Group A, C, and D members are assumed to retire when first eligible.

The retirement rates were based on historical and current demographic data, adjusted to reflect conditions of the various industries, and estimated future experience and professional judgment. As part of the analysis, a comparison was made between the actual number of retirements by age and the projected number based on the prior assumption over the four-year period ending June 30, 2014.

**Inactive Members:**

Valuation liability equals 250% of accumulated contributions.

**Future Administrative Expenses:**

No provisions made; expenses of the System are paid by the State.

**Unknown Data for Participants:**

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

**Percent Married:**

- Groups A/D 75.4% of male members and 64.0% of female members are assumed to be married.
- Group C 73.3% of male members and 61.0% of female members are assumed to be married.
- Group F 71.4% of male members and 63.1% of female members are assumed to be married.

**Age of Spouse:**

Females three years younger than males.

<b>Actuarial Value of Assets:</b>	The amount of the assets for valuation purposes equals the preliminary asset value plus 20% of the difference between market and preliminary asset values. The preliminary asset value is equal to the previous year's asset value (for valuation purposes) adjusted for contributions less benefit payments and expenses plus expected investment income. If necessary, a further adjustment is made to ensure that the valuation assets are within 20% of the market value.
<b>Actuarial Cost Method:</b>	Entry Age Actuarial Cost Method. Entry Age is the age at date of employment or, if date is unknown, current age minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary, with Normal Cost determined using the plan of benefits applicable to each participant.
<b>Changes in Actuarial Assumptions:</b>	<p>Based on reviews of economic assumptions, rates of mortality and future expectations of experience, the following actuarial assumptions was changed:</p> <ul style="list-style-type: none"> <li>• Assumed inflation was lowered from 3.00% to 2.50%.</li> <li>• Investment return was lowered from 7.95% to 7.50%.</li> <li>• Assumed COLA increases were lowered from 3.00% to 2.55% for Group A, C and D members and for Group F members who retired after July 1, 2008, and from 1.50% to 1.40% for all other Group F members.</li> <li>• Mortality tables were updated from variations of RP-2000 with static projection to variations of RP-2014 with generational improvement.</li> </ul>

## EXHIBIT II – SUMMARY OF PLAN PROVISIONS

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

<b>Effective Date:</b>	July 1, 1972 (for consolidated system).
<b>Creditable Service:</b>	Service as a member plus purchased service.
<b>Average Final Compensation (AFC):</b>	<ul style="list-style-type: none"> <li>• Groups A/F Average annual compensation during highest 3 consecutive years.</li> <li>• Group C Average annual compensation during highest 2 consecutive years.</li> <li>• Group D Annual compensation at retirement.</li> </ul>
<b>Normal Retirement – Eligibility:</b>	<ul style="list-style-type: none"> <li>• Group A Earlier of age 65 with 5 years of service for members hired after July 1, 2004, and age 62 with 20 years of service.</li> <li>• Group C Age 55.</li> <li>• Group D Age 62 with 5 years of service.</li> <li>• Group F Age 62 or 30 years of service. For members hired after June 30, 2008, age 65 or a sum of age plus service greater than or equal to 87.</li> </ul>
<b>Normal Retirement – Amount:</b>	<ul style="list-style-type: none"> <li>• Group A 1.67% of AFC times service.</li> <li>• Group C 2.50% of AFC times service up to 20 years.</li> <li>• Group D 3.33% of AFC times service up to 30 years.</li> <li>• Group F 1.25% of AFC times service prior to January 1, 1991, plus 1.67% of AFC times service after 1990, up to a maximum benefit of 50% of AFC. For members hired on or after July 1, 2008, the maximum benefit is 60% of AFC.</li> </ul>
<b>Early Retirement – Eligibility:</b>	<ul style="list-style-type: none"> <li>• Groups A/D Age 55 with 5 years of service or 30 years of service.</li> <li>• Group C Age 50 with 20 years of service.</li> <li>• Group F Age 55 with 5 years of service.</li> </ul>
<b>Early Retirement – Amount:</b>	<ul style="list-style-type: none"> <li>• Group A Actuarial equivalent of normal retirement allowance. For members with 30 years of service, there is no reduction.</li> <li>• Group C Same as normal retirement allowance.</li> <li>• Group D Normal allowance reduced by 3% for each year commencement precedes age 62.</li> <li>• Group F For members hired prior to July 1, 2008, no reduction if 30 years of service; otherwise normal allowance reduced by 6% for each year commencement precedes age 62. For members</li> </ul>

hired on or after July 1, 2008, no reduction if combination of years and service equal 87; other reduced from age 65 based on the following table:

Years of Service	Reduction in Benefit
35	One-eighth of 1% per year
30	One-fourth of 1% per year
25	One-third of 1% per year
20	Five-twelfths of 1% per year
Less than 20	Five-ninths of 1% per year

<b>Vesting:</b>	<ul style="list-style-type: none"> <li>All groups – 5 years of service.</li> <li>Allowance beginning at normal retirement age based on AFC and service at termination.</li> </ul>
<b>Ordinary Disability – Eligibility:</b>	<ul style="list-style-type: none"> <li>All groups – 5 years of service and incapacitated, not work related, for performance of duty.</li> </ul>
<b>Ordinary Disability – Amount:</b>	<ul style="list-style-type: none"> <li>All groups – Immediate allowance based on service to date of disability. Benefit is the greatest of 25% of AFC and unreduced accrued benefit as of date of disability.</li> </ul>
<b>Accidental Disability – Eligibility:</b>	<ul style="list-style-type: none"> <li>All groups – Incapacitated because of work related accident.</li> </ul>
<b>Accidental Disability – Amount:</b>	<ul style="list-style-type: none"> <li>Groups A/D/F Immediate allowance based on service projected to normal retirement. Benefit is the greater of 25% of AFC and unreduced accrued benefit as of date of disability.</li> <li>Group C Immediate allowance equal to 50% of AFC with additional 10% of AFC for each dependent child (up to 30%).</li> </ul>
<b>Ordinary Death – Eligibility:</b>	<ul style="list-style-type: none"> <li>Groups A/F Death after eligibility for early retirement or 10 years of service.</li> <li>Groups C/D Death after normal retirement age or 10 years of service.</li> </ul>
<b>Ordinary Death – Amount:</b>	<ul style="list-style-type: none"> <li>Groups A/D/F Maximum of reduced allowance under 100% survivor option and disability allowance under 100% disability survivor option, commencing immediately.</li> <li>Group C 70% of the allowance that would have been payable to the member plus additional allowance equal to 10% of AFC for each dependent child (up to 30%).</li> </ul>
<b>Accidental Death – Eligibility:</b>	<ul style="list-style-type: none"> <li>All groups – Death because of work related accident.</li> </ul>
<b>Accidental Death – Amount:</b>	<ul style="list-style-type: none"> <li>Groups A/D/F Allowance equal to 25% of AFC payable to spouse.</li> <li>Group C Allowance equal to 35% of AFC payable to spouse plus 10% for each dependent child (up to 30%).</li> </ul>

<b>Post-Retirement Adjustments:</b>	<ul style="list-style-type: none"> <li>• Groups A/C/D Allowances in payment for at least one year increased on each January 1 by the percentage increase in Consumer Price Index, but not more than 5%.</li> <li>• Group F Same, but increase is based on half of the Consumer Price Index increase. Increase is based on the full Consumer Price Index increase starting in 2014 for employees retiring after July 1, 2008.</li> </ul>
<b>Optional Benefit and Death after Retirement:</b>	Lifetime allowance or actuarially equivalent allowance with survivor benefit as elected by member upon retirement. Upon death of a Group C member, an allowance equal to 70% of the member's allowance is continue to the surviving spouse.
<b>Refund of Contributions:</b>	Upon termination, if the member so elects, or if no other benefit is payable, the member's accumulated contributions with interest are refunded.
<b>Member Contribution Rates:</b>	<ul style="list-style-type: none"> <li>• Groups A/D/F 6.65%.</li> <li>• Group C 8.53%.</li> </ul>
<b>Changes in Plan Provisions:</b>	There have been no changes in plan provisions since the last valuation.

## Section 5: Additional Summary Tables of Member Data

TABLE 1A – PARTICIPANTS IN ACTIVE SERVICE AS OF JUNE 30, 2017  
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE PAYROLL

### All Employee Groups

Age	Years of Creditable Service								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 25	272	270	2	--	--	--	--	--	--
	\$32,835	\$32,721	\$48,330	--	--	--	--	--	--
25 - 29	743	627	113	3	--	--	--	--	--
	\$44,987	\$42,366	\$59,228	\$56,384	--	--	--	--	--
30 - 34	923	570	271	80	2	--	--	--	--
	\$49,992	\$44,723	\$58,491	\$58,644	\$53,977	--	--	--	--
35 - 39	951	439	239	223	50	--	--	--	--
	\$55,979	\$47,175	\$59,712	\$66,341	\$69,215	--	--	--	--
40 - 44	1,008	335	178	242	203	46	4	--	--
	\$60,096	\$45,093	\$61,061	\$68,384	\$72,399	\$68,319	\$53,373	--	--
45 - 49	1,214	315	184	224	220	161	108	2	--
	\$63,212	\$47,177	\$59,561	\$64,745	\$72,390	\$74,367	\$77,127	\$93,730	--
50 - 54	1,191	283	156	197	205	128	136	81	5
	\$62,714	\$48,245	\$60,176	\$65,079	\$68,555	\$70,712	\$71,746	\$69,077	\$74,622
55 - 59	1,136	234	143	200	175	94	139	76	75
	\$63,184	\$51,793	\$58,690	\$63,754	\$62,835	\$70,762	\$72,365	\$74,222	\$68,894
60 - 64	843	134	110	129	145	81	80	69	95
	\$66,249	\$52,416	\$60,847	\$66,634	\$66,186	\$68,316	\$72,033	\$75,143	\$78,494
65 & over	339	46	51	65	49	21	28	23	56
	\$68,393	\$54,006	\$62,606	\$61,688	\$66,145	\$76,658	\$80,971	\$81,850	\$80,312
Total	8,620	3,253	1,447	1,363	1,049	531	495	251	231
	\$58,533	\$45,142	\$59,714	\$65,212	\$68,713	\$71,491	\$73,514	\$73,669	\$75,734

**TABLE 1B – PARTICIPANTS IN ACTIVE SERVICE AS OF JUNE 30, 2017  
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE PAYROLL**

**General Employees – Group A**

Age	Years of Creditable Service								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 25	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--
35 - 39	--	--	--	--	--	--	--	--	--
40 - 44	--	--	--	--	--	--	--	--	--
45 - 49	--	--	--	--	--	--	--	--	--
50 - 54	1	--	--	--	--	--	--	1	--
	\$72,353	--	--	--	--	--	--	\$72,353	--
55 - 59	--	--	--	--	--	--	--	--	--
60 - 64	1	--	--	--	--	--	--	--	1
	\$113,293	--	--	--	--	--	--	--	\$113,293
65 & over	1	--	--	--	--	--	--	--	1
	\$57,007	--	--	--	--	--	--	--	\$57,007
<b>Total</b>	<b>3</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>1</b>	<b>2</b>
	<b>\$80,884</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>--</b>	<b>\$72,353</b>	<b>\$85,150</b>

**TABLE 1C – PARTICIPANTS IN ACTIVE SERVICE AS OF JUNE 30, 2017  
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE PAYROLL**

**Law Enforcement Personnel – Group C**

Age	Years of Creditable Service								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 25	22	22	--	--	--	--	--	--	--
	\$48,454	\$48,454	--	--	--	--	--	--	--
25 - 29	69	47	22	--	--	--	--	--	--
	\$69,079	\$64,531	\$78,795	--	--	--	--	--	--
30 - 34	73	25	40	8	--	--	--	--	--
	\$69,229	\$60,808	\$72,961	\$76,889	--	--	--	--	--
35 - 39	66	8	19	35	4	--	--	--	--
	\$80,732	\$64,720	\$74,709	\$84,442	\$108,910	--	--	--	--
40 - 44	84	6	7	32	34	5	--	--	--
	\$88,765	\$55,750	\$75,484	\$85,755	\$100,188	\$88,556	--	--	--
45 - 49	105	3	7	18	40	20	17	--	--
	\$97,944	\$71,181	\$61,812	\$89,291	\$98,090	\$100,594	\$123,247	--	--
50 - 54	33	2	3	4	14	3	5	2	--
	\$83,105	\$49,932	\$60,916	\$79,344	\$94,540	\$96,762	\$72,386	\$83,354	--
55 - 59	1	--	--	1	--	--	--	--	--
	\$76,250	--	--	\$76,250	--	--	--	--	--
60 - 64	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
65 & over	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--
Total	453	113	98	98	92	28	22	2	--
	\$81,178	\$60,042	\$73,625	\$84,853	\$98,796	\$98,034	\$111,688	\$83,354	--

**TABLE 1D – PARTICIPANTS IN ACTIVE SERVICE AS OF JUNE 30, 2017  
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE PAYROLL**

**Judges – Group D**

Age	Years of Creditable Service									
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over	
Under 25	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
25 - 29	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
30 - 34	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
35 - 39	--	--	--	--	--	--	--	--	--	--
	--	--	--	--	--	--	--	--	--	--
40 - 44	1	1	--	--	--	--	--	--	--	--
	\$116,432	\$116,432	--	--	--	--	--	--	--	--
45 - 49	2	--	2	--	--	--	--	--	--	--
	\$136,432	--	\$136,432	--	--	--	--	--	--	--
50 - 54	10	3	4	1	2	--	--	--	--	--
	\$131,862	\$106,557	\$146,476	\$144,598	\$134,225	--	--	--	--	--
55 - 59	8	3	1	2	--	1	1	--	--	--
	\$127,868	\$144,598	\$115,567	\$92,192	--	\$144,598	\$144,598	--	--	--
60 - 64	13	3	1	5	2	--	--	1	1	
	\$140,672	\$144,598	\$144,598	\$146,100	\$115,320	--	--	\$144,598	\$144,598	
65 & over	19	1	4	6	2	2	1	2	1	
	\$99,514	\$78,512	\$93,841	\$81,700	\$97,574	\$123,389	\$144,598	\$104,026	\$152,107	
<b>Total</b>	<b>53</b>	<b>11</b>	<b>12</b>	<b>14</b>	<b>6</b>	<b>3</b>	<b>2</b>	<b>3</b>	<b>2</b>	
	\$121,705	\$125,655	\$124,525	\$110,692	\$115,706	\$130,459	\$144,598	\$117,550	\$148,353	

**TABLE 1E – PARTICIPANTS IN ACTIVE SERVICE AS OF JUNE 30, 2017  
BY AGE, YEARS OF CREDITABLE SERVICE, AND AVERAGE PAYROLL**

**General Employees – Group F**

Age	Years of Creditable Service								
	Total	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35 & over
Under 25	250	248	2	--	--	--	--	--	--
	\$31,461	\$31,325	\$48,330	--	--	--	--	--	--
25 - 29	674	580	91	3	--	--	--	--	--
	\$42,520	\$40,570	\$54,497	\$56,384	--	--	--	--	--
30 - 34	850	545	231	72	2	--	--	--	--
	\$48,340	\$43,986	\$55,985	\$56,617	\$53,977	--	--	--	--
35 - 39	885	431	220	188	46	--	--	--	--
	\$54,133	\$46,849	\$58,417	\$62,971	\$65,763	--	--	--	--
40 - 44	923	328	171	210	169	41	4	--	--
	\$57,426	\$44,681	\$60,470	\$65,737	\$66,809	\$65,851	\$53,373	--	--
45 - 49	1,107	312	175	206	180	141	91	2	--
	\$59,785	\$46,946	\$58,592	\$62,601	\$66,678	\$70,647	\$68,512	\$93,730	--
50 - 54	1,147	278	149	192	189	125	131	78	5
	\$61,516	\$47,603	\$57,844	\$64,367	\$65,936	\$70,087	\$71,722	\$68,669	\$74,622
55 - 59	1,127	231	142	197	175	93	138	76	75
	\$62,714	\$50,588	\$58,290	\$63,402	\$62,835	\$69,968	\$71,842	\$74,222	\$68,894
60 - 64	829	131	109	124	143	81	80	68	93
	\$65,025	\$50,305	\$60,079	\$63,430	\$65,499	\$68,316	\$72,033	\$74,121	\$77,409
65 & over	319	45	47	59	47	19	27	21	54
	\$66,575	\$53,462	\$59,948	\$59,653	\$64,808	\$71,739	\$78,615	\$79,738	\$79,414
Total	8,111	3,129	1,337	1,251	951	500	471	245	227
	\$56,847	\$44,321	\$58,112	\$63,164	\$65,506	\$69,651	\$71,429	\$73,058	\$75,011

**TABLE 2A – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**All Employee Groups**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
≤35	0	\$0	1	\$35,373	66	\$441,391
36	0	0	0	0	0	0
37	0	0	1	9,071	0	0
38	0	0	0	0	1	7,262
39	0	0	0	0	0	0
40	0	0	2	61,662	1	5,399
41	0	0	2	23,624	0	0
42	0	0	0	0	1	9,649
43	0	0	1	8,218	0	0
44	1	10,109	2	36,477	1	7,970
45	0	0	2	27,744	4	70,850
46	2	59,373	2	27,094	0	0
47	2	47,843	5	65,539	1	11,480
48	2	52,409	3	42,457	4	36,530
49	6	185,389	7	140,789	1	7,526
50	14	689,634	2	55,819	2	26,902
51	21	944,193	5	174,924	1	7,397
52	21	847,446	10	176,269	2	33,115
53	31	1,190,247	8	130,615	4	70,470
54	30	1,292,242	10	150,023	1	11,161
55	58	1,692,774	16	243,043	6	59,365
56	47	1,312,188	16	233,419	3	45,596
57	70	2,038,421	6	99,637	6	62,882
58	78	1,925,458	13	162,300	3	33,917
59	88	2,669,014	16	244,383	14	238,164
60	114	3,323,625	12	158,363	6	81,654
61	121	2,830,696	12	181,234	13	194,222
62	199	4,295,237	20	262,267	16	188,044
63	243	4,650,364	16	144,315	15	222,334
64	254	5,193,701	21	298,743	14	224,574
65	281	5,263,987	29	311,293	6	91,931

**TABLE 2A – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

All Employee Groups (Continued)

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
66	304	\$6,252,137	17	\$228,713	16	\$187,922
67	339	6,763,431	15	198,807	12	159,111
68	314	6,076,144	18	233,219	9	125,039
69	336	6,370,282	13	160,747	17	266,579
70	330	6,823,551	11	224,881	18	235,782
71	222	4,527,089	10	121,124	14	184,041
72	217	3,976,399	7	84,883	19	224,025
73	195	3,488,448	13	171,116	25	323,799
74	220	4,226,414	7	78,774	24	331,048
75	176	3,365,015	7	61,620	21	262,597
76	143	2,279,360	8	135,251	21	240,861
77	139	2,201,666	8	112,179	20	208,840
78	116	1,729,249	3	17,166	20	237,562
79	98	1,543,460	8	101,076	11	130,845
80	93	1,553,076	7	60,561	13	135,189
81	111	1,799,256	3	21,538	25	375,228
82	87	1,482,051	4	42,192	24	270,376
83	78	1,183,002	2	15,733	18	214,672
84	83	1,119,597	2	12,073	12	108,510
85	57	714,295	1	5,340	15	155,617
86	71	982,152	1	4,755	16	207,982
87	56	765,312	1	6,317	16	194,015
88	46	567,801	0	0	10	118,385
89	29	460,662	2	17,089	15	143,822
90	26	440,052	1	7,764	5	34,095
91	29	356,664	0	0	7	41,347
92	23	246,439	0	0	5	50,846
93	12	136,506	1	9,945	4	22,243
94	19	241,425	2	28,151	2	61,278
≥95	28	253,632	0	0	9	82,574
Total	5,680	\$112,438,916	412	\$5,665,710	635	\$7,524,016

**TABLE 2B – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**General Employees – Group A**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
≤35	0	\$0	0	\$0	0	\$0
36	0	0	0	0	0	0
37	0	0	0	0	0	0
38	0	0	0	0	0	0
39	0	0	0	0	0	0
40	0	0	0	0	0	0
41	0	0	0	0	0	0
42	0	0	0	0	0	0
43	0	0	0	0	0	0
44	0	0	0	0	0	0
45	0	0	0	0	0	0
46	0	0	0	0	0	0
47	0	0	0	0	0	0
48	0	0	0	0	0	0
49	0	0	0	0	0	0
50	0	0	0	0	0	0
51	0	0	0	0	0	0
52	0	0	0	0	0	0
53	0	0	0	0	0	0
54	0	0	0	0	0	0
55	1	8,661	0	0	0	0
56	0	0	0	0	0	0
57	0	0	0	0	0	0
58	0	0	0	0	0	0
59	2	82,631	0	0	1	6,907
60	0	0	0	0	0	0
61	0	0	0	0	0	0
62	2	58,197	1	14,398	0	0
63	0	0	1	1,808	0	0
64	0	0	1	16,679	1	9,090
65	5	107,633	1	7,990	0	0

**TABLE 2B – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**General Employees – Group A (Continued)**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
66	3	\$75,679	0	\$0	0	\$0
67	3	77,320	0	0	0	0
68	4	102,024	1	20,879	0	0
69	5	125,532	1	7,732	1	23,066
70	4	105,364	0	0	1	38,080
71	7	197,981	0	0	0	0
72	0	0	0	0	2	18,624
73	3	89,500	0	0	2	19,541
74	0	0	0	0	1	14,896
75	6	189,934	0	0	2	24,801
76	4	96,680	0	0	3	38,171
77	2	44,497	0	0	0	0
78	6	175,184	0	0	0	0
79	4	96,429	1	11,959	0	0
80	7	141,777	1	12,354	0	0
81	3	78,087	0	0	0	0
82	8	233,108	0	0	0	0
83	4	93,179	0	0	0	0
84	3	81,982	0	0	0	0
85	3	68,762	0	0	2	21,218
86	5	154,456	0	0	3	36,464
87	6	123,928	0	0	1	4,104
88	3	68,671	0	0	1	12,967
89	2	54,520	1	12,146	3	30,940
90	1	7,306	1	7,764	2	14,026
91	3	46,272	0	0	5	32,880
92	1	11,576	0	0	1	15,399
93	1	18,164	1	9,945	1	3,359
94	3	29,291	2	28,151	0	0
≥95	8	98,175	0	0	5	33,383
Total	122	\$2,942,500	13	\$151,806	38	\$397,915

**TABLE 2C – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**State Police and Motor Vehicle Inspectors – Group B**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
≤35	0	\$0	0	\$0	0	\$0
36	0	0	0	0	0	0
37	0	0	0	0	0	0
38	0	0	0	0	0	0
39	0	0	0	0	0	0
40	0	0	0	0	0	0
41	0	0	0	0	0	0
42	0	0	0	0	0	0
43	0	0	0	0	0	0
44	0	0	0	0	0	0
45	0	0	0	0	0	0
46	0	0	0	0	0	0
47	0	0	0	0	0	0
48	0	0	0	0	0	0
49	0	0	0	0	0	0
50	0	0	0	0	0	0
51	0	0	0	0	0	0
52	0	0	0	0	1	19,930
53	0	0	0	0	0	0
54	0	0	0	0	0	0
55	0	0	0	0	0	0
56	0	0	0	0	0	0
57	0	0	0	0	0	0
58	0	0	0	0	0	0
59	1	11,258	0	0	0	0
60	0	0	0	0	0	0
61	0	0	0	0	0	0
62	0	0	0	0	0	0
63	1	9,671	0	0	0	0
64	0	0	0	0	0	0
65	0	0	0	0	0	0

**TABLE 2C – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**State Police and Motor Vehicle Inspectors – Group B (Continued)**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
66	1	\$4,922	0	\$0	0	\$0
67	0	0	0	0	0	0
68	0	0	1	20,722	0	0
69	0	0	0	0	1	13,027
70	1	37,892	0	0	0	0
71	2	65,547	0	0	0	0
72	0	0	0	0	0	0
73	0	0	1	21,630	0	0
74	1	8,927	0	0	1	17,111
75	1	25,890	0	0	0	0
76	0	0	0	0	0	0
77	0	0	0	0	0	0
78	0	0	0	0	0	0
79	0	0	0	0	0	0
80	0	0	0	0	0	0
81	0	0	0	0	0	0
82	0	0	0	0	0	0
83	0	0	0	0	0	0
84	0	0	0	0	0	0
85	0	0	0	0	0	0
86	0	0	0	0	0	0
87	0	0	0	0	0	0
88	0	0	0	0	0	0
89	0	0	0	0	0	0
90	0	0	0	0	0	0
91	0	0	0	0	0	0
92	0	0	0	0	0	0
93	0	0	0	0	0	0
94	0	0	0	0	0	0
≥95	0	0	0	0	0	0
Total	8	\$164,107	2	\$42,353	3	\$50,068

**TABLE 2D – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**Law Enforcement Personnel – Group C**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
≤35	0	\$0	1	\$35,373	28	\$249,442
36	0	0	0	0	0	0
37	0	0	0	0	0	0
38	0	0	0	0	0	0
39	0	0	0	0	0	0
40	0	0	1	50,712	0	0
41	0	0	0	0	0	0
42	0	0	0	0	0	0
43	0	0	0	0	0	0
44	0	0	1	30,940	0	0
45	0	0	1	17,794	2	51,546
46	0	0	0	0	0	0
47	1	17,986	0	0	0	0
48	0	0	0	0	1	12,820
49	3	112,830	1	42,076	0	0
50	8	517,919	1	44,926	0	0
51	13	744,831	3	154,375	0	0
52	12	592,207	1	48,998	0	0
53	10	550,810	1	16,048	1	23,508
54	11	702,171	1	26,042	0	0
55	14	491,333	0	0	0	0
56	7	345,364	2	78,525	0	0
57	18	915,445	0	0	0	0
58	14	587,970	0	0	0	0
59	15	901,940	1	36,438	1	20,413
60	19	1,096,647	1	11,380	1	28,077
61	15	698,088	0	0	1	35,815
62	17	809,184	0	0	1	22,664
63	7	290,316	0	0	1	31,095
64	13	607,959	2	73,715	2	42,909
65	9	358,080	0	0	1	11,757

## TABLE 2D – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE

### Law Enforcement Personnel – Group C (Continued)

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
66	5	\$244,748	0	\$0	1	\$30,340
67	13	545,665	1	35,140	1	16,246
68	4	142,876	1	30,884	1	24,225
69	9	341,091	1	44,474	2	67,552
70	12	550,471	3	119,057	2	44,170
71	10	429,158	1	42,802	0	0
72	1	27,412	1	34,435	0	0
73	5	190,001	1	33,018	3	86,556
74	10	466,182	0	0	2	63,810
75	6	280,198	0	0	1	28,366
76	5	189,192	0	0	2	58,051
77	4	175,840	1	29,855	2	58,161
78	3	132,470	0	0	2	48,927
79	2	88,634	1	28,587	2	36,438
80	3	149,183	0	0	1	18,764
81	2	74,372	0	0	3	109,832
82	3	141,374	0	0	3	108,030
83	0	0	0	0	2	62,931
84	3	118,938	0	0	2	56,924
85	2	90,412	0	0	1	30,557
86	5	170,256	0	0	2	58,137
87	2	90,211	0	0	4	83,715
88	3	100,258	0	0	0	0
89	0	0	0	0	1	27,104
90	1	42,903	0	0	0	0
91	0	0	0	0	0	0
92	0	0	0	0	1	16,199
93	0	0	0	0	0	0
94	0	0	0	0	0	0
≥95	1	18,684	0	0	0	0
Total	320	\$15,141,609	29	\$1,065,593	81	\$1,665,081

**TABLE 2E – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**Judges – Group D**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
≤35	0	\$0	0	\$0	0	\$0
36	0	0	0	0	0	0
37	0	0	0	0	0	0
38	0	0	0	0	0	0
39	0	0	0	0	0	0
40	0	0	0	0	0	0
41	0	0	0	0	0	0
42	0	0	0	0	0	0
43	0	0	0	0	0	0
44	0	0	0	0	0	0
45	0	0	0	0	0	0
46	0	0	0	0	0	0
47	0	0	0	0	0	0
48	0	0	0	0	0	0
49	0	0	0	0	0	0
50	0	0	0	0	0	0
51	0	0	0	0	0	0
52	0	0	0	0	0	0
53	0	0	0	0	1	11,206
54	0	0	0	0	0	0
55	0	0	0	0	0	0
56	0	0	0	0	0	0
57	0	0	0	0	0	0
58	0	0	0	0	0	0
59	1	25,911	0	0	0	0
60	0	0	0	0	0	0
61	0	0	0	0	0	0
62	1	22,375	0	0	0	0
63	1	100,626	0	0	0	0
64	4	263,398	0	0	0	0
65	0	0	0	0	0	0

**TABLE 2E – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**Judges – Group D (Continued)**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
66	2	\$147,076	0	\$0	0	\$0
67	3	253,879	0	0	0	0
68	5	327,208	0	0	0	0
69	2	200,787	0	0	0	0
70	2	185,912	0	0	0	0
71	2	44,677	0	0	1	26,683
72	1	16,780	0	0	1	19,947
73	2	154,971	0	0	0	0
74	4	320,580	0	0	0	0
75	4	273,730	0	0	0	0
76	0	0	0	0	0	0
77	1	75,651	0	0	0	0
78	1	35,488	0	0	0	0
79	1	80,987	0	0	0	0
80	3	172,839	0	0	0	0
81	2	149,314	0	0	1	33,294
82	1	100,098	0	0	0	0
83	0	0	0	0	0	0
84	1	96,808	0	0	0	0
85	2	65,440	0	0	0	0
86	0	0	0	0	0	0
87	1	39,825	0	0	1	28,913
88	0	0	0	0	1	66,967
89	2	138,399	0	0	0	0
90	2	135,288	0	0	0	0
91	0	0	0	0	0	0
92	2	68,552	0	0	0	0
93	1	10,061	0	0	0	0
94	1	57,901	0	0	1	48,311
≥95	1	22,129	0	0	1	26,805
Total	56	\$3,586,689	0	\$0	8	\$262,126

**TABLE 2F – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**General Employees – Groups E/F**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
≤35	0	\$0	0	\$0	38	\$191,949
36	0	0	0	0	0	0
37	0	0	1	9,071	0	0
38	0	0	0	0	1	7,262
39	0	0	0	0	0	0
40	0	0	1	10,950	1	5,399
41	0	0	2	23,624	0	0
42	0	0	0	0	1	9,649
43	0	0	1	8,218	0	0
44	1	10,109	1	5,537	1	7,970
45	0	0	1	9,950	2	19,304
46	2	59,373	2	27,094	0	0
47	1	29,856	5	65,539	1	11,480
48	2	52,409	3	42,457	3	23,709
49	3	72,559	6	98,713	1	7,526
50	6	171,715	1	10,894	2	26,902
51	8	199,362	2	20,549	1	7,397
52	9	255,240	9	127,271	1	13,184
53	21	639,437	7	114,568	2	35,756
54	19	590,071	9	123,981	1	11,161
55	43	1,192,781	16	243,043	6	59,365
56	40	966,823	14	154,893	3	45,596
57	52	1,122,976	6	99,637	6	62,882
58	64	1,337,488	13	162,300	3	33,917
59	69	1,647,275	15	207,945	12	210,845
60	95	2,226,978	11	146,983	5	53,577
61	106	2,132,608	12	181,234	12	158,408
62	179	3,405,482	19	247,868	15	165,380
63	234	4,249,751	15	142,508	14	191,239
64	237	4,322,344	18	208,349	11	172,576
65	267	4,798,274	28	303,303	5	80,174

**TABLE 2F – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY ATTAINED AGE**

**General Employees – Groups E/F (Continued)**

Age	Service Pensioners		Disability Pensioners		Beneficiaries	
	Number	Annual Allowance	Number	Annual Allowance	Number	Annual Allowance
66	293	\$5,779,712	17	\$228,713	15	\$157,582
67	320	5,886,568	14	163,668	11	142,866
68	301	5,504,037	15	160,733	8	100,814
69	320	5,702,873	11	108,541	13	162,934
70	311	5,943,912	8	105,824	15	153,532
71	201	3,789,726	9	78,322	13	157,358
72	215	3,932,207	6	50,448	16	185,454
73	185	3,053,976	11	116,467	20	217,701
74	205	3,430,725	7	78,774	20	235,232
75	159	2,595,263	7	61,620	18	209,430
76	134	1,993,488	8	135,251	16	144,639
77	132	1,905,676	7	82,324	18	150,679
78	106	1,386,106	3	17,166	18	188,634
79	91	1,277,410	6	60,531	9	94,407
80	80	1,089,277	6	48,207	12	116,425
81	104	1,497,483	3	21,538	21	232,101
82	75	1,007,470	4	42,192	21	162,346
83	74	1,089,823	2	15,733	16	151,741
84	76	821,869	2	12,073	10	51,585
85	50	489,681	1	5,340	12	103,843
86	61	657,440	1	4,755	11	113,380
87	47	511,348	1	6,317	10	77,283
88	40	398,872	0	0	8	38,450
89	25	267,743	1	4,943	11	85,777
90	22	254,554	0	0	3	20,069
91	26	310,393	0	0	2	8,467
92	20	166,311	0	0	3	19,249
93	10	108,281	0	0	3	18,884
94	15	154,232	0	0	1	12,967
≥95	18	114,645	0	0	3	22,387
Total	5,174	\$90,604,011	368	\$4,405,958	505	\$5,148,826

## TABLE 3 – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY YEAR OF RETIREMENT

### All Employee Groups

Year of Retirement	Number	Annual Allowance	Average Annual Allowance
≤1970	1	\$4,104	\$4,104
1971	0	0	0
1972	2	30,830	15,415
1973	0	0	0
1974	1	7,226	7,226
1975	1	18,796	18,796
1976	1	8,638	8,638
1977	3	34,228	11,409
1978	3	44,702	14,901
1979	4	65,651	16,413
1980	7	59,088	8,441
1981	3	25,589	8,530
1982	13	135,072	10,390
1983	14	170,115	12,151
1984	13	201,322	15,486
1985	23	330,716	14,379
1986	26	338,141	13,005
1987	41	547,438	13,352
1988	39	645,260	16,545
1989	41	647,953	15,804
1990	73	885,993	12,137
1991	79	1,322,911	16,746
1992	58	575,954	9,930
1993	88	1,287,590	14,632
1994	61	873,642	14,322
1995	99	1,306,769	13,200
1996	334	5,377,857	16,101
1997	89	1,586,799	17,829
1998	94	1,545,905	16,446
1999	122	1,960,973	16,074
2000	152	2,376,447	15,635

## TABLE 3 – SUMMARY OF RETIRED MEMBER AND BENEFICIARY DATA BY YEAR OF RETIREMENT

All Employee Groups (continued)

Year of Retirement	Number	Annual Allowance	Average Annual Allowance
2001	160	\$2,376,052	\$14,850
2002	172	3,061,861	17,802
2003	187	3,621,063	19,364
2004	248	4,774,017	19,250
2005	252	4,426,811	17,567
2006	249	4,953,878	19,895
2007	285	5,455,943	19,144
2008	297	6,000,953	20,205
2009	502	10,337,114	20,592
2010	361	7,320,699	20,279
2011	345	6,660,663	19,306
2012	354	7,038,247	19,882
2013	328	6,369,464	19,419
2014	365	7,081,133	19,400
2015	518	10,343,738	19,969
2016	400	8,494,860	21,237
2017	219	4,896,439	22,358
<b>Total</b>	<b>6,727</b>	<b>\$125,628,642</b>	<b>\$18,675</b>