

**City of Atlanta General
Employees' Pension Fund**
**Actuarial Valuation and
Review as of July 1, 2017**

DRAFT

This report has been prepared at the request of the Board of Trustees to assist in administering the Pension Fund. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board of Trustees and may only be provided to other parties in its entirety. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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August 6, 2018

Board Members
City of Atlanta General Employees' Pension Fund
Atlanta, Georgia

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of July 1, 2017. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements 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 Pension Fund. The census information on which our calculations were based was prepared by Zenith American Solutions and the financial information was provided by the City of Atlanta Department of Finance. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Jeanette R. Cooper, FSA, FCA, MAAA, Enrolled Actuary. Ms. Cooper is a member of the American Academy of Actuaries and meets the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein. To the best of her knowledge, the information supplied in this actuarial valuation is complete and accurate. Further, in her opinion, the assumptions as approved by the Board are reasonably related to the experience of and the expectations for the Fund.

We hereby certify that the City of Atlanta General Employees' Pension Fund for the General Employees of the City has been funded in conformity with the minimum funding standards specified in Code Section 47-20-10 of the Official Code of Georgia Annotated known as the Public Pension Funds Standards Law. This certification covers the 2017 fiscal year of the Plan.

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

Sincerely,

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

By:

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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 City of Atlanta General Employees' Pension Fund as of July 1, 2017. The valuation was performed to determine whether the assets and contributions rates 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 Fund assets to cover the estimated cost of settling the Fund'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, 2018 and June 30, 2017 was provided in separate reports.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Fund, as administered by the Board;
- The characteristics of covered active participants, inactive participants, and retired participants and beneficiaries as of June 30, 2017, provided by Zenith American Solutions;
- The assets of the Fund as of June 30, 2017, provided by the City of Atlanta Department of Finance;
- Economic assumptions regarding future salary increases and investment earnings;
- Other actuarial assumptions regarding employee terminations, retirement, death, etc.; and
- The funding policy adopted by the City.

Significant Issues

1. The July 1, 2017 valuation is used to determine the recommended contribution for the fiscal year period July 1, 2018 to June 30, 2019 (FY'19). The recommended contribution is adjusted for interest to the middle of the fiscal period and satisfies the minimum funding standards under Georgia law Code Section 47-20-10.
2. The plan receives employee contributions of 12% or 13% of base salary (8% for employees hired after October 31, 2011). The City contributes the recommended contribution amount which is net of employee contributions. The recommended contribution amount is composed of the employer normal cost including administrative expenses and a payment to amortize the Unfunded Actuarial Accrued Liability (UAAL) over 23 years. The recommended contribution is actuarially determined as a level percentage of payroll and will increase 3.00% annually if all assumptions are met.
3. Segal Consulting (“Segal”) 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 adopted by the City meets this standard.
4. The City’s recommended contribution for FY '19 is \$47.2 million, or 27.30% of projected payroll. This amount is a decrease of about \$4.7 million from the prior valuation’s cost and is attributable to new actuarial assumptions as well as both a gain on the actuarial value of assets and cost of living adjustments. This was partially offset by the scheduled increase in the amortization payment of the unfunded liability and a new explicit administrative expense assumption. See *Section 2: Reconciliation of ADC* for additional details.
5. The total contributions made during the fiscal year ending June 30, 2017 were not sufficient to cover the normal cost plus interest on the UAAL so did not reduce the unfunded actuarial accrued liability. While the unfunded actuarial accrued liability is lower than in the prior valuation, the decrease is due to assumption changes and experience gains.
6. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is 67.03%, compared to the prior year funded ratio of 60.39%. 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 67.95%, compared to 59.13% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of Fund assets to cover the estimated cost of settling the Fund’s benefit obligation or the need for or the amount of future contributions.
7. The unfunded actuarial accrued liability is \$596.5 million, which is a decrease of \$155.6 million since the prior valuation.
8. The actuarial gain from investment and other experience is \$71.1 million, or 3.8% of actuarial accrued liability.
9. The net experience gain from sources other than investment experience was 2.4% of the actuarial accrued liability prior to reflection of assumption changes. This gain was primarily due to cost-of-living adjustments and salary increases less than assumed.

10. The rate of return on the market value of assets was 13.73% for the July 1, 2016 to June 30, 2017 plan year. The return on the actuarial value of assets was 9.82% for the same period due to the recognition of prior years' investment gains and losses. This resulted in an actuarial gain when measured against the assumed rate of return of 7.50%. This actuarial investment gain decreased the employer contribution rate by about \$1.8 million. Effective with this valuation, the assumed rate of return has been lowered from 7.50% to 7.25%. Given the low fixed income interest rate environment, target asset allocation and expectations of future investment returns for various classes, we advise the Board to continue to monitor actual and anticipated investment returns relative to the assumed long-term rate of return on investments of 7.25%.
11. The actuarial value of assets is 98.65% 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 gain is recognized in future years, the cost of the Plan is likely to decrease unless the net gain is offset by future experience. The recognition of the market gains of \$16.6 million will also have an impact on the future funded ratio. If the net deferred gains were recognized immediately in the actuarial value of assets, the actuarially determined contribution would decrease from 27.30% to about 26.64% of payroll.
12. In addition to the decrease in the investment return assumption from 7.50% to 7.25%, numerous actuarial assumptions were approved by the Board and changed with this valuation, following the completion of a comprehensive experience study. Details of the new assumptions are provided in *Section 4, Exhibit I*. The assumption changes decreased the actuarial accrued liability by \$87.4 million or 4.6% and decreased the recommended contribution by \$0.7 million, or 0.62% of projected payroll.
13. There have been no changes in plan provisions or actuarial methods since the last valuation.
14. The disclosure information required for compliance with GASB Statement No. 67, *Financial Reporting for Pension Plans* for the fiscal year ended June 30, 2017, was released to the City's Finance Department on September 19, 2017. Draft information required for compliance with GASB Statement No. 68, *Accounting and Financial Reporting for Pensions*, for the fiscal year ended June 30, 2018, based on a June 30, 2017 measurement date was released to the City's Finance Department on April 25, 2018.
15. This actuarial report as of July 1, 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.
16. Since the actuarial valuation results are dependent on a given set of assumptions, there is a risk that emerging results may differ significantly as actual experience proves to be different from the assumptions. We have included a discussion of various risks that may affect the plan in *Section 2, H*.

Summary of Key Valuation Results

FISCAL YEAR		2018	2017
Contributions for fiscal year beginning July 1:	Actuarially determined contributions	\$47,220,491	\$51,902,994
	Actuarially determined contributions as a percent of payroll	27.30%	30.33%
PLAN YEAR		2017	2016
Actuarial accrued liability for plan year beginning July 1:	Retired participants and beneficiaries	\$1,269,403,712	\$1,325,373,642
	Inactive vested participants and deferred beneficiaries	8,577,768	7,322,128
	Active participants	530,102,189	565,279,371
	Inactive participants due a refund of employee contributions	1,277,771	1,020,022
	Total	1,809,361,440	1,898,995,163
	Normal cost including administrative expenses for plan year beginning July 1 ¹	23,316,877	19,756,319
Assets for plan year beginning July 1:	Market value of assets (MVA)	\$1,229,420,000	\$1,122,786,000
	Actuarial value of assets (AVA)	1,212,852,870	1,146,863,597
	Actuarial value of assets as a percentage of market value of assets	98.65%	102.14%
Funded status for plan year beginning July 1:	Unfunded actuarial accrued liability on market value of assets	\$579,941,440	\$776,209,163
	Funded percentage on MVA basis	67.95%	59.13%
	Unfunded actuarial accrued liability on actuarial value of assets	\$596,508,570	\$752,131,566
	Funded percentage on AVA basis	67.03%	60.39%
	Amortization period on an AVA basis	23	24
Key assumptions:	Net investment return	7.25%	7.50%
	Inflation rate	2.25%	2.75%
	Payroll increase	3.00%	3.50%
Demographic data for plan year beginning July 1:	Number of retired participants and beneficiaries	3,889	3,874
	Number of inactive vested participants and deferred beneficiaries	90	71
	Number of active participants	3,688	3,452
	Number of inactive participants entitled to a refund of employee contributions	330	204
	Covered payroll	\$167,902,833	\$165,320,333
	Average payroll	45,527	47,891
	Projected payroll	172,939,918	171,106,545

¹ Administrative expenses not included for plan year beginning July 1, 2017.

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:

Plan of benefits	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.
Participant data	An actuarial valuation for a plan is based on data provided to the actuary by the plan administrator. 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.
Assets	The valuation is based on the market value of assets as of the valuation date, as provided by the City of Atlanta Department of Finance. The City 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.
Actuarial assumptions	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 Board. Segal is not responsible for the use or misuse of its report, particularly by any other party.
- An actuarial valuation is a measurement of the 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 Board 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 Board should look to their other advisors for expertise in these areas.

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

Section 2: Actuarial Valuation Results

A. Participant Data

The Actuarial Valuation and Review considers the number and demographic characteristics of covered participants, including active participants, inactive vested participants, retired participants 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, B, and C.*

PARTICIPANT POPULATION: 2007 – 2017

Year Ended June 30 ¹	Active Participants	Inactive Vested Participants ²	Retired Participants and Beneficiaries	Total Non-Actives	Ratio of Non-Actives to Actives
2007	4,261	92	3,308	3,400	0.80
2008	3,414	116	3,504	3,620	1.06
2010	3,261	129	3,605	3,734	1.15
2011	3,093	124	3,765	3,889	1.26
2012	3,159	85	3,826	3,911	1.24
2013	3,171	129	3,790	3,919	1.24
2014	3,243	182	3,805	3,987	1.23
2015	3,307	241	3,834	4,075	1.23
2016	3,452	275	3,874	4,149	1.20
2017	3,688	420	3,889	4,309	1.17

¹ Prior to 2010, the valuation cycle was for the 12 month period ending December 31.

² Excludes participants receiving Workers' Compensation benefits and includes terminated participants due a refund of employee contributions.

Active Participants

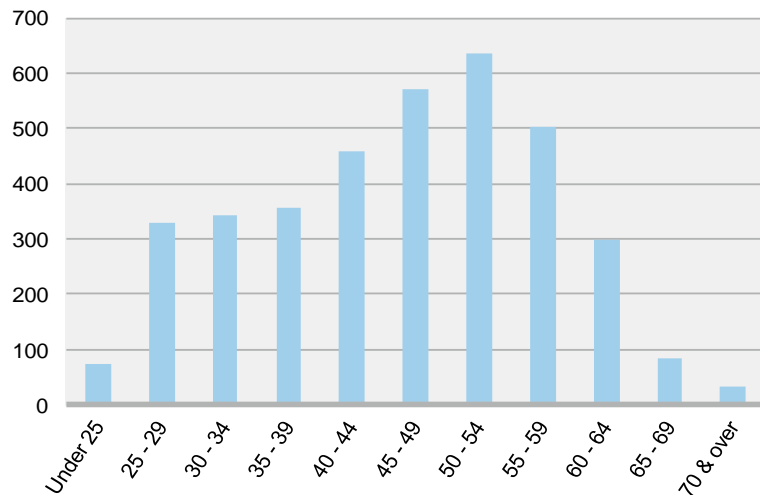
Plan costs are affected by the age, years of service and payroll of active participants. In this year's valuation, there were 3,688 active participants with an average age of 46.4, average years of service of 10.7 years and average payroll of \$45,527. The 3,452 active participants in the prior valuation had an average age of 46.8, average service of 11.2 years and average payroll of \$47,891.

Inactive Participants

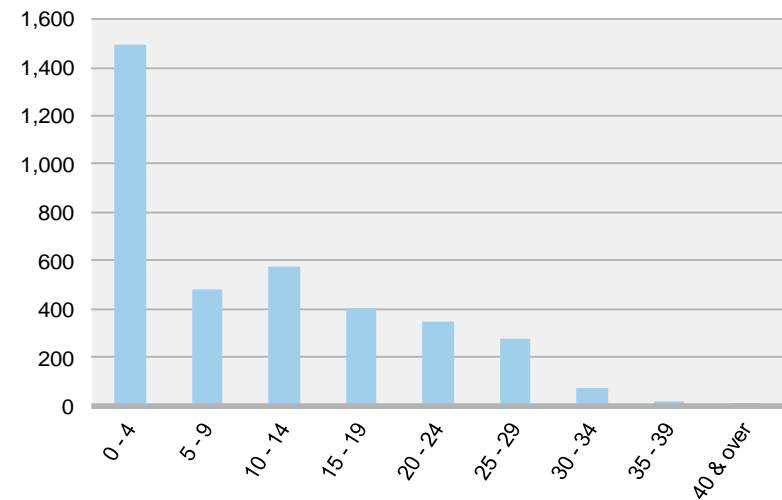
In this year's valuation, there were 89 participants with a vested right to a deferred or immediate vested benefit and one beneficiary with a right to a deferred benefit. In addition, there were 330 participants entitled to a return of their employee contributions.

Distribution of Active Participants as of June 30, 2017

ACTIVES BY AGE



ACTIVES BY YEARS OF SERVICE



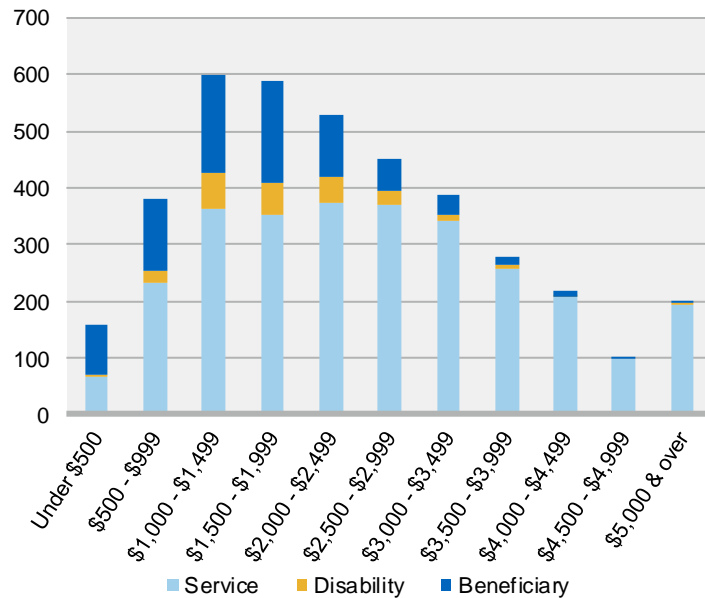
Retired Participants and Beneficiaries

As of June 30, 2017, 3,094 retired participants and 795 beneficiaries were receiving total monthly benefits of \$9,532,191. For comparison, in the previous valuation, there were 3,103 retired participants and 771 beneficiaries receiving monthly benefits of \$9,362,949. There were ten retired participants in suspended status this year compared to eight retired participants in suspended status in the prior valuation.

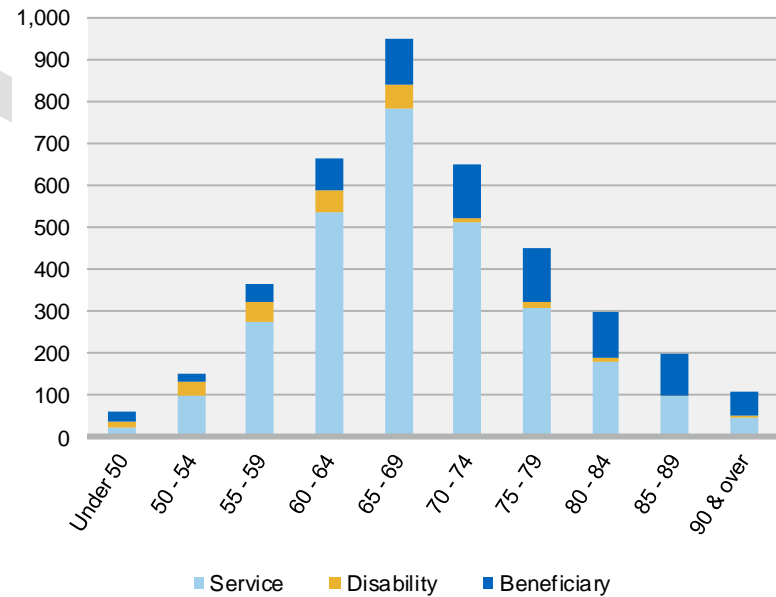
As of June 30, 2017, the average monthly benefit for retired participants and beneficiaries is \$2,455, compared to \$2,417 in the previous valuation. The average age for retired participants and beneficiaries is 69.8 in the current valuation, compared with 69.3 in the prior valuation.

Distribution of Pensioners as of June 30, 2017

PENSIONERS AND BENEFICIARIES BY TYPE AND MONTHLY AMOUNT



PENSIONERS AND BENEFICIARIES BY TYPE AND BY AGE



Historical Plan Population

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

PARTICIPANT DATA STATISTICS: 2007 – 2017

Year Ended June 30 ¹	Active Participants			Retired Participants and Beneficiaries		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2007 ²	4,261	46.0	11.0	3,308	67.9	\$1,836
2008	3,414	46.5	11.5	3,504	66.7	1,979
2010	3,261	46.6	11.7	3,605	67.6	2,047
2011	3,093	47.3	12.8	3,765	67.5	2,119
2012	3,159	47.2	12.5	3,826	67.7	2,210
2013	3,171	47.3	12.5	3,790	68.0	2,293
2014	3,243	47.4	12.4	3,805	68.3	2,342
2015	3,307	47.3	12.0	3,834	68.7	2,387
2016	3,452	46.8	11.2	3,874	69.3	2,417
2017	3,688	46.4	10.7	3,889	69.8	2,455

¹ Prior to 2010, the valuation cycle was for the 12 month period ending December 31.

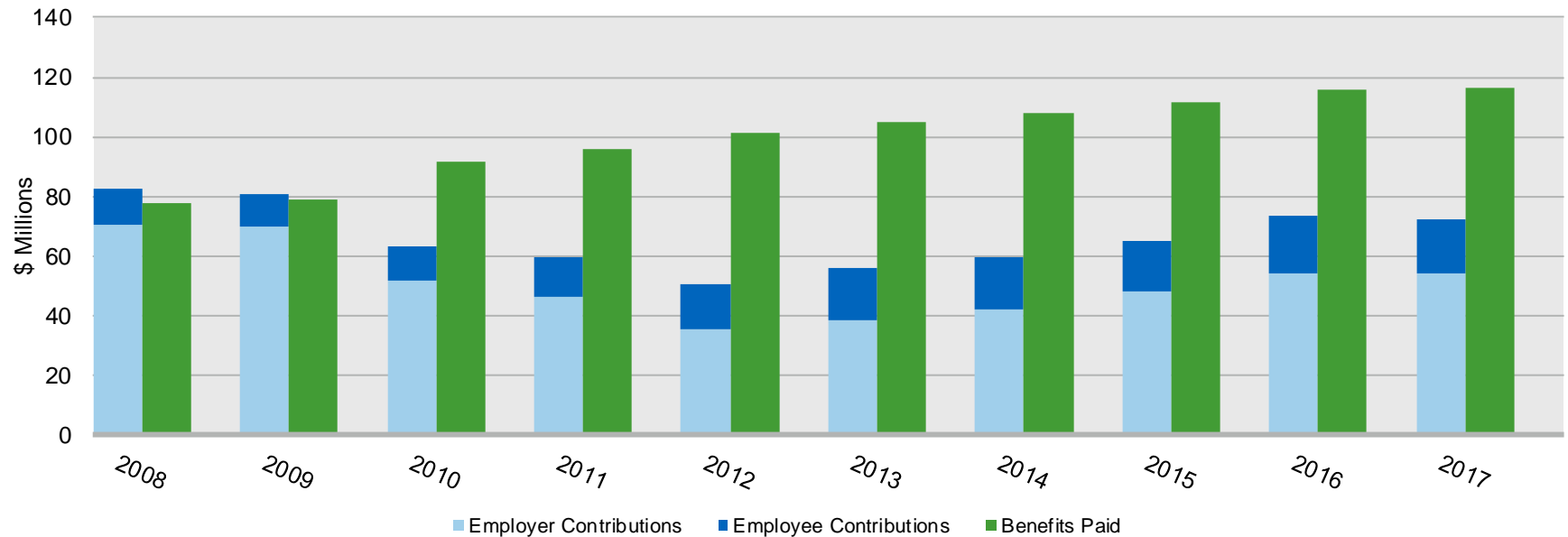
² Excludes 511 new active participants who transferred to the defined contribution plan.

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 transactions for the valuation year, is presented in *Section 3, Exhibits D, E and F*.

**COMPARISON OF CONTRIBUTIONS MADE WITH BENEFITS AND EXPENSES 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 approved an asset valuation method that gradually adjusts to market value. Under this valuation method, the full value of market fluctuations is not recognized in a single year and, as a result, the asset value and the plan costs are more stable. The amount of the adjustment to recognize market value is treated as income, which may be positive or negative. Realized and unrealized gains and losses are treated equally and, therefore, the sale of assets has no immediate effect on the actuarial value.

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

1.	Market value of assets, June 30, 2017				\$1,229,420,000
2.	Calculation of unrecognized return	Original Amount *	Percent Deferred	Unrecognized Amount**	
	(a) Year ended June 30, 2017	\$68,568,900	80%	\$54,855,120	
	(b) Year ended June 30, 2016	-79,572,275	60	-47,743,365	
	(c) Year ended June 30, 2015	-29,016,925	40	-11,606,770	
	(d) Year ended June 30, 2014	105,310,725	20	21,062,145	
	(e) Year ended June 30, 2013	74,330,440	0	<u>0</u>	
	(f) Total unrecognized return				16,567,130
3.	Preliminary actuarial value: (1) - (2f)				\$1,212,852,870
4.	Adjustment to be within 20% corridor				0
5.	Final actuarial value of assets as of June 30, 2017: (3) + (4)				<u>1,212,852,870</u>
6.	Actuarial value as a percentage of market value: (5) ÷ (1)				98.65%
7.	Amount deferred for future recognition: (1) - (5)				\$16,567,130

*Total return minus expected return on a market value basis

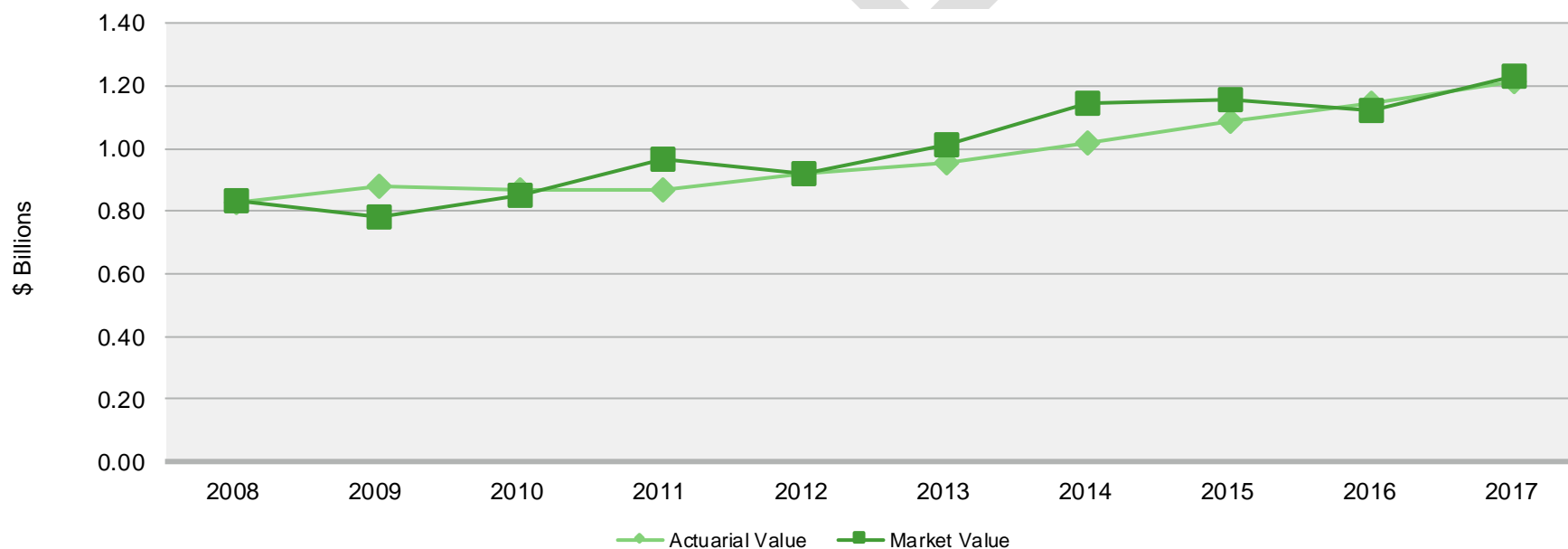
**Recognition at 20% per year over five years

***Deferred return as of June 30, 2017 recognized in each of the next four years:

(a) Amount recognized on June 30, 2018	\$13,058,085
(b) Amount recognized on June 30, 2019	-8,004,060
(c) Amount recognized on June 30, 2020	-2,200,675
(d) Amount recognized on June 30, 2021	13,713,780

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

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



C. Actuarial Experience

To calculate any 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), any contribution requirement will decrease from the previous year. On the other hand, any 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 total gain is \$71,091,076, which includes \$26,118,353 from investment gains and \$44,972,723 in gains from all other sources. The net experience variation from individual sources other than investments was 2.4% of the actuarial accrued liability. 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 from investments*	\$26,118,353
2	Net gain/(loss) from other experience**	44,972,723
3	Net experience gain: 1 + 2	\$71,091,076

* Details on next page.

** Details on page 21.

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 Fund's investment policy. The rate of return on the market value of assets was 13.73% for the year ended June 30, 2017.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.25%. However, the gain is measured against the 7.50% assumption that was in place for last year. The actual rate of return on an actuarial basis for the 2016-2017 plan year was 9.82%. Since the actual return for the year was greater than the assumed return, the Fund experienced an actuarial gain during the year ended June 30, 2017 with regard to its investments.

INVESTMENT EXPERIENCE

	Year Ended June 30, 2017		Year Ended June 30, 2016	
	Market Value	Actuarial Value	Market Value	Actuarial Value
1 Net investment income	\$151,110,000	\$110,465,273	\$5,587,000	\$99,369,668
2 Average value of assets	1,100,548,000	1,124,625,597	1,135,457,000	1,065,751,929
3 Rate of return: 1 ÷ 2	13.73%	9.82%	0.49%	9.32%
4 Assumed rate of return	7.50%	7.50%	7.50%	7.50%
5 Expected investment income: 2 x 4	82,541,100	84,346,920	85,159,275	79,931,395
6 Actuarial gain/(loss): 1 – 5	<u>\$68,568,900</u>	<u>\$26,118,353</u>	<u>-\$79,572,275</u>	<u>\$19,438,273</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 chart below shows the rate of return on an actuarial basis compared to the actual market value investment return for the last 20 years, including averages over select time periods.

INVESTMENT RETURN – ACTUARIAL VALUE VS. MARKET VALUE: 1997 - 2017

Year Ended June 30 ¹	Actuarial Value Investment Return		Market Value Investment Return		Year Ended June 30 ²	Actuarial Value Investment Return		Market Value Investment Return	
	Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent
1997	\$95,414,000	20.09%	\$95,414,000	20.09%	2008	\$50,125,917	6.45%	-\$27,014,531	-3.15%
1998	99,411,000	17.02	99,411,000	17.02	2009	11,812,857	1.36	-90,617,329	-10.39
1999	51,690,000	7.78	51,690,000	7.78	2010	13,845,996	1.60	96,241,481	12.53
2000	116,042,400	9.67	18,124,000	2.61	2011	38,679,811	4.56	149,657,731	17.98
2001	-4,178,800	-0.56	-12,887,000	-1.86	2012	21,039,393	2.49	4,967,000	0.53
2002	-13,112,400	-1.82	-50,686,000	-7.67	2013	86,311,648	9.66	145,776,000	16.32
2003	1,312,772	0.19	89,769,919	15.12	2014	110,185,508	11.84	179,568,000	18.14
2004	12,001,697	1.78	68,415,406	10.24	2015	114,271,773	11.51	55,130,000	4.91
2005	19,984,377	2.93	654,115	0.09	2016	99,369,668	9.32	5,587,000	0.49
2007 ²	50,849,393	4.78	101,463,275	9.06	2017	110,465,273	9.82	151,110,000	13.73
Total	\$429,414,439		\$461,368,715			\$656,107,844		\$670,405,352	
						Most recent five-year average return	10.40%		10.25%
						Most recent ten-year average return	7.98%		7.05%
						Most recent 15-year average return	5.58%		6.62%
						Most recent 20-year average return	6.70%		6.90%

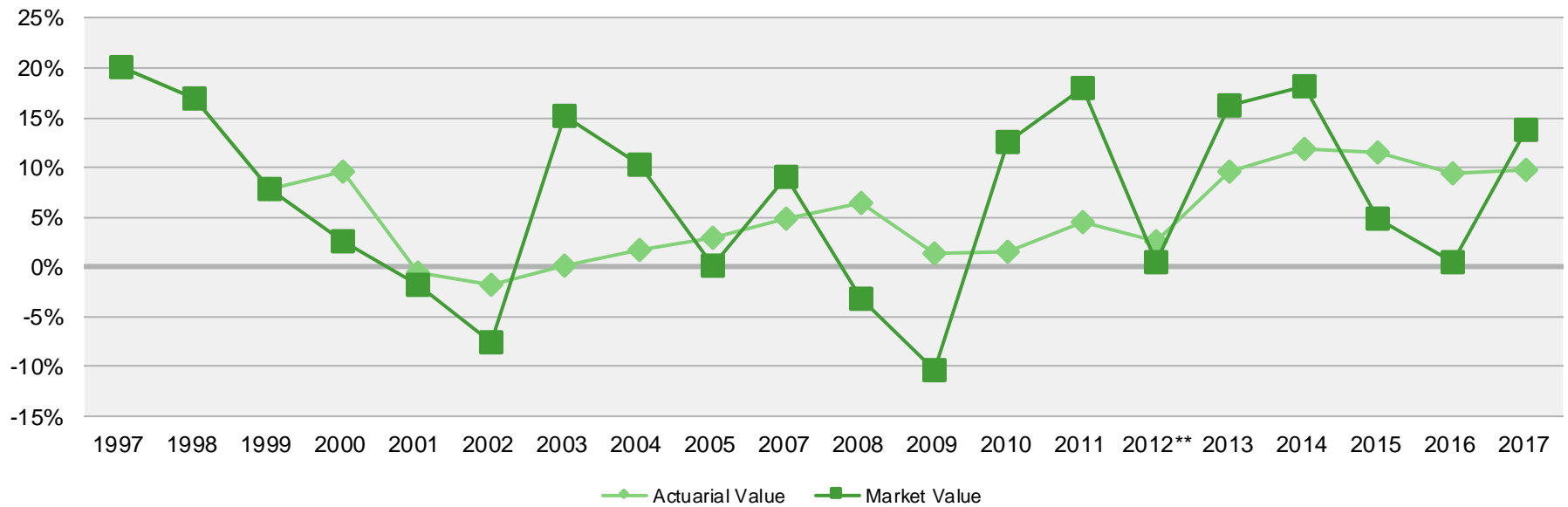
Note: Each year's yield is weighted by the average asset value in that year.

¹ Prior to 2007, financial information was based on 12 month periods ending December 31.

² The amounts for the year ended June 30, 2007 represent an 18-month period from January 1, 2006 through June 30, 2007. The percentages shown have been annualized.

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, 1997 - 2017



* Prior to 2007, financial information was based on 12 month periods ending December 31.

** Actuarial value rate of return before method change.

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), and
- salary increases (greater or smaller than projected).

The net gain from this other experience for the year ended June 30, 2017 amounted to \$44,972,723, which is 2.4% of the actuarial accrued liability.

LIABILITY CHANGES DUE TO DEMOGRAPHIC EXPERIENCE FOR YEAR ENDED JUNE 30, 2017

Gain due to cost-of-living increases smaller than expected	\$24,021,845
Gain due to salary increases less than assumed	15,550,444
Gain due to mortality experience for participants in pay status	5,165,046
Net miscellaneous gain including new entrants, salary increases, turnover and other demographic experience	<u>235,388</u>
Total	\$44,972,723

D. Changes in the Actuarial Accrued Liability

The actuarial accrued liability as of July 1, 2017 is \$1,809,361,440, a decrease of \$89,633,723, or 4.7%, from the actuarial accrued liability as of the prior valuation date. The change in liability is due to actuarial experience (as discussed in the previous subsection), and changes in the assumptions.

Actuarial Assumptions

A comprehensive Actuarial Experience Review, covering the period July 1, 2011 through June 30, 2016, was completed in 2017. As a result of that study, the following assumption changes were proposed by the actuary and subsequently were approved by the Board in August, 2017. These changes are reflected for the first time in this valuation.

- The investment return assumption was lowered from 7.50% to 7.25%.
- The inflation assumption was lowered from 2.75% to 2.25%.
- The payroll growth assumption decreased from 3.50% to 3.00%, maintaining the productivity assumption of 0.75%.
- The age-based salary scale table was maintained with rates modified to reflect higher merit and promotional increases and lower inflation.
- The cost-of-living adjustment for hires before November 1, 2011 was decreased from 3.00% to 2.25% compounded annually. There was no change in the 1.00% COLA assumption for hires after October 31, 2011.
- A flat administrative expense assumption of \$1,200,000, projected to increase annually with the inflation assumption, was introduced.
- The pre-retirement mortality assumption was changed from the sex-distinct RP-2000 Combined Healthy Mortality Table, to the sex-distant approximate RP-2006 Blue Collar Employee Table, with rates increased by 25%.
- The post-retirement mortality assumption for healthy annuitants was changed from the sex-distinct RP-2000 Combined Healthy Mortality Table, to the sex-distant approximate RP-2006 Blue Collar Healthy Annuitant Table, with rates increased by 25%.
- The mortality assumption for disabled retirees was changed from the sex-distinct RP-2000 Disabled Retiree Mortality Table, to the sex-distant approximate RP-2006 Disabled Retiree Table, with rates increased by 25%.
- In conjunction with the revised mortality tables, a sex-distinct generational protection of scale SSA2016-2D was introduced for all lives.
- The retirement rates for participants with 30 or more years of service were decreased for age 53 to 64; the current rates for participants with less than 30 years of service at retirement were left unchanged.

- The sex-distinct ordinary disability rates were lowered to 80% of the existing age-based rates. The occupational disability assumption of 10% of ordinary disability rates was maintained.
- The existing gender-neutral, service-based withdrawal rates were maintained with decreases only in the rates for participants with less than two years of service.
- The assumption that 50% of terminated participants hired prior to November 1, 2011 will take a refund of contributions was increased to 75%; there was no change in the 100% assumption for terminated participants hired after October 31, 2011.
- Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

The assumption changes decreased the actuarial accrued liability by \$87,417,579 or 4.6% and the annual required contribution by \$723,265, or 0.62% of projected payroll.

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	\$752,131,566
2	Normal cost at beginning of year	19,756,319
3	Total contributions	-72,060,000
4	Interest	
	For whole year on 1 + 2	\$57,891,591
	For half year on 3	<u>-2,702,251</u>
	Total interest	<u>55,189,340</u>
5	Expected unfunded actuarial accrued liability	\$755,017,225
6	Changes due to:	
	(Gain)/loss	-71,091,076
	Assumptions	<u>-87,417,579</u>
	Total changes	<u>-\$158,508,655</u>
7	Unfunded actuarial accrued liability at end of year	<u>\$596,508,570</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. For the fiscal year beginning July 1, 2018, the actuarially determined contribution is \$47,220,491, or 27.30% of projected payroll.

The City sets the methodology used to calculate the actuarially determined contribution based on a closed level percentage of payroll amortization period of 30 years, established with the July 1, 2010 valuation. As of the July 1, 2017 valuation, there are 23 years remaining on this schedule.

The contribution requirement for the 2018-2019 fiscal year 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 and, actuarial gains and losses.

ACTUARIALLY DETERMINED CONTRIBUTION FOR FISCAL YEAR BEGINNING JULY 1

	2018		2017	
	Amount	% of Projected Payroll	Amount	% of Projected Payroll
1. Total normal cost	\$22,116,877	12.79%	\$19,756,319	11.54%
2. Administrative expenses	1,200,000	0.69%	0	0.00%
3. Expected employee contributions	<u>-18,091,163</u>	<u>-10.46%</u>	<u>-18,228,401</u>	<u>-10.65%</u>
4. Employer normal cost: (1) + (2) - (3)	\$5,225,714	3.02%	\$1,527,918	0.89%
5. Actuarial accrued liability	1,809,361,440		1,898,995,163	
6. Actuarial value of assets	1,212,852,870		1,146,863,597	
7. Unfunded actuarial accrued liability: (5) - (6)	596,508,570		752,131,566	
8. Payment on unfunded actuarial accrued liability	39,042,767	22.57%	46,838,935	27.37%
9. Adjustment for timing*	<u>2,952,010</u>	<u>1.71%</u>	<u>3,536,141</u>	<u>2.07%</u>
10. Total recommended contribution: (4) + (8) + (9)	<u>\$47,220,491</u>	<u>27.30%</u>	<u>\$51,902,994</u>	<u>30.33%</u>
11. Projected payroll	\$172,939,918		\$171,106,545	

*Actuarially determined contributions are assumed to be paid at the middle of every year.

Reconciliation of Actuarially Determined Contribution

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

RECONCILIATION OF ACTUARIALLY DETERMINED CONTRIBUTION FOR FISCAL YEAR ENDING 2018 TO 2019

	Amount
Actuarially Determined Contribution for Fiscal Year ending in 2018	\$51,902,994
Effect of gains and losses on accrued liability	-3,085,768
Effect of changes in actuarial assumptions other than administrative expenses	-2,003,286
Effect of investment gain	-1,792,090
Effect of expected change in amortization payment due to payroll growth	1,759,218
Effect of change in administrative expense assumption	1,280,021
Effect of contributions more than actuarially determined contribution	-217,669
Net effect of other changes, including composition and number of participants	-622,929
Total change	-\$4,682,503
Actuarially Determined Contribution for Fiscal Year ending in 2019	\$47,220,491

G. History of City Contributions

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

HISTORY OF CITY CONTRIBUTIONS: 2009 – 2018

Fiscal Year Ended June 30	Actuarially Determined Employer Contribution (ADEC)*	Actual Employer Contribution	Percent Contributed
2009	\$69,990,896	\$69,990,896	100.00%
2010	51,699,072	51,761,766	100.12%
2011	46,067,793	46,078,000	100.02%
2012	35,237,651	35,237,000	100.00%
2013	38,688,054	38,694,000	100.02%
2014	42,145,284	42,145,000	100.00%
2015	47,969,283	48,015,000	100.10%
2016	54,235,740	54,236,000	100.00%
2017	53,815,973	53,817,000	100.00%
2018	51,902,994	--	--

*Prior to GASB 67/68, this amount was the Annual Required Contribution (ARC).

H. Risk

Since the actuarial valuation results are dependent on a given set of assumptions and data as of a specific date, there is a risk that emerging results may differ significantly as actual experience differs from the assumptions.

This report does not contain a detailed analysis of the potential range of future measurements, but does include a brief discussion of some risks that may affect the Fund. Upon request, a more detailed assessment of the risks can be provided to enable a better understanding of the risks specific to your Fund.

- Investment Risk (the risk that returns will be different than expected)

Since the Plan's assets are much larger than contributions, investment performance may create volatility in contribution requirements.

The market value rate of return over the last 20 years has ranged from a low of -10.39% to a high of 20.09%.

- Longevity Risk (the risk that mortality experience will be different than expected)

The actuarial valuation includes an expectation of future improvement in life expectancy. Emerging plan experience that does not match these expectations will result in either an increase or decrease in the actuarially determined contribution.

- Contribution Risk (the risk that actual contributions will be different from actuarially determined contributions)

The City's funding policy requires payment of the actuarially determined contribution. As long as this policy is adhered to, contribution risk is negligible.

- Demographic Risk (the risk that participant experience will be different than assumed)

Examples of this risk include:

- Actual retirements occurring earlier or later than assumed. The value of retirement plan benefits is sensitive to the rate of benefit accruals and any early retirement subsidies that apply.
- More or less active participant turnover than assumed.

While it is difficult to quantify the impact of potential experience, for your Fund, each 1% change in the actuarial cost factors would result in a change in the unfunded actuarial accrued liability of \$18,093,614 or 3.0%.

- Actual Experience Over the Last Ten Years and Implications for the Future

Past experience can help demonstrate the sensitivity of key results to the Plan's actual experience. Over the past ten years:

The investment gain(loss) on an actuarial value basis for a year has ranged from a loss of \$57,642,125 in 2009 to a gain of \$40,388,059 in 2014.

The non-investment gain(loss) for a year has ranged from a loss of \$57,411,893 in 2011 to a gain of \$109,354,132 in 2009.

The funded percentage on the actuarial value of assets has ranged from a low of 51.02% as of July 1, 2012 to a high of 67.03% as of July 1, 2017. The funded percentage on the market value of assets has ranged from a low of 51.02% as of July 1, 2012 to a high of 67.95% as of July 1, 2017.

- Maturity Measures

As pension plans mature, the cash need to fulfill benefit obligations will increase over time. Therefore, cash flow projections and analysis should be performed to assure that the Plan's asset allocation is aligned to meet emerging pension liabilities.

Currently the Plan has a non-active to active participant ratio of 1.17. For the prior year benefits paid were \$44.5 million more than contributions received. As the Fund matures, more cash will be needed from the investment portfolio to meet benefit payments.

I. GFOA Solvency Test

The Actuarial Accrued Liability represents the present value of benefits earned, calculated using the plan's actuarial cost method. The Actuarial Value of Assets reflects the financial resources available to liquidate the liability. The portion of the liability covered by assets reflects the extent to which accumulated plan assets are sufficient to pay future benefits, and is shown for liabilities associated with employee contributions, pensioner liabilities, and other liabilities. The Government Finance Officers Association (GFOA) recommends that the funding policy aim to achieve a funded ratio of 100 percent.

GFOA SOLVENCY TEST AS OF JUNE 30

	2017	2016
Actuarial accrued liability (AAL)		
Active member contributions	\$133,303,265	\$125,158,991
Retirees and beneficiaries	1,269,403,712	1,325,373,642
Active and inactive members (employer-financed)	406,654,463	448,462,530
Total	\$1,809,361,440	\$1,898,995,163
Actuarial value of assets	\$1,212,852,870	\$1,146,863,597
Cumulative portion of AAL covered		
Active member contributions	100.00%	100.00%
Retirees and beneficiaries	85.04%	77.09%
Active and inactive members (employer-financed)	0.00%	0.00%

J. Actuarial Balance Sheet

An overview of the plan’s funding is given by an Actuarial Balance Sheet. In this approach, first the amount and timing of all future payments that will be made by the Fund for current participants is determined. Then these payments are discounted at the valuation interest rate to the date of the valuation, thereby determining the present value, referred to as the “liability” of the Fund.

Second, this liability is compared to the assets. The “assets” for this purpose include the net amount of assets already accumulated by the Fund, 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
Liabilities		
Present value of benefits for retired participants and beneficiaries	\$1,269,403,712	\$1,325,373,642
Present value of benefits for inactive vested participants	9,855,539	8,342,150
Present value of benefits for active participants	<u>697,639,140</u>	<u>700,434,971</u>
Total liabilities	\$1,976,898,391	\$2,034,150,763
Assets		
Total valuation value of assets	\$1,212,852,870	\$1,146,863,597
Present value of future contributions by members	144,928,973	130,938,550
Present value of future City contributions for:		
Entry age cost	22,607,978	4,217,050
Unfunded actuarial accrued liability	<u>596,508,570</u>	<u>752,131,566</u>
Total of current and future assets	<u>\$1,976,898,391</u>	<u>\$2,034,150,763</u>

K. Actuarial Present Value of Accumulated Plan Benefits

The actuarial present value of accumulated plan benefits is shown below as of July 1, 2017 and as of July 1, 2016.

ACTUARIAL PRESENT VALUE OF ACCUMULATED PLAN BENEFITS

	Benefit Information Date	
	July 1, 2017	July 1, 2016
Actuarial present value of vested accumulated plan benefits:		
• Participants currently receiving payments	\$1,269,403,712	\$1,325,373,642
• Other vested benefits	<u>365,571,545</u>	<u>357,197,143</u>
• Total vested benefits (PVVB)	1,634,975,257	1,682,570,785
Actuarial present value of non-vested accumulated plan benefits	<u>52,927,045</u>	<u>67,635,199</u>
Total actuarial present value of accumulated plan benefits (PVAB)	<u>\$1,687,902,302</u>	<u>\$1,750,205,984</u>
Actuarial Value of Assets (AVA)	\$1,212,852,870	\$1,146,863,597
Market Value of Assets (MVA)	\$1,229,420,000	\$1,122,786,000
Funded Ratios (PVVB):		
• AVA as a percentage of present value of vested accumulated benefits	74.18%	68.16%
• MVA as a percentage of present value of vested accumulated benefits	75.20%	66.73%
Funded Ratios (PVAB):		
• AVA as a percentage of present value of accumulated benefits	71.86%	65.53%
• MVA as a percentage of present value of accumulated benefits	72.84%	64.15%

Note: The amounts stated as vested benefits include employee contribution accounts, which are considered 100% vested.

The factors that affected the change in the actuarial present value of accumulated plan benefits from the preceding to the current benefit information date are as follows:

Factors	Change in Actuarial Present Value of Accumulated Plan Benefits
Benefits accumulated, net experience gain or loss, changes in data	\$8,212,393
Benefits paid	-116,536,000
Interest	126,895,349
Changes in assumptions	<u>-80,875,424</u>
Total	<u>-\$62,303,682</u>

L. State Minimum Requirements

Under Georgia minimum funding requirements, the liability may be amortized as a percent of payroll, rather than a fixed dollar amount. In general, with fixed dollar amortization, actual experience close to the assumptions will result in a total contribution requirement (the normal cost plus the payment on the unfunded actuarial liability) that decreases over time as a percentage of payroll. With percentage of payroll amortization, given expected experience, the total contribution requirement should remain level as a percentage of payroll.

Prior to the 2005 valuation, the Plan had adopted the policy of amortizing the unfunded actuarial liability as a level percentage of payroll over a closed 40-year period from January 1, 1979. At January 1, 2005, the amortization was reset to a closed 20-year period. Effective July 1, 2008, the amortization period was changed to an open 30-year period and effective July 1, 2010, the amortization period was changed to a closed 30-year period. The contributions determined under this method continue to meet the Georgia minimum funding requirements by virtue of Georgia Code Section 47-20-10(b).

Section 3: Supplemental Information

EXHIBIT A – TABLE OF PLAN COVERAGE

Category	Year Ended June 30		Change From Prior Year
	2017	2016	
Active participants in valuation:			
Number	3,688	3,452	6.8%
Average age	46.4	46.8	-0.4
Average years of service	10.7	11.2	-0.5
Total payroll	\$167,902,833	\$165,320,333	1.6%
Average payroll	45,527	47,891	-4.9%
Account balances	133,303,265	125,158,991	6.5%
Total active vested participants	1,919	2,011	-4.6%
Inactive participants:			
Number of vested terminated participants	89	71	25.4%
Number of inactive nonvested participants due a refund	330	204	61.8%
Beneficiaries with rights to a deferred benefit	1	0	N/A
Retired participants:			
Number in pay status	2,847	2,856	-0.3%
Average age	69.0	68.4	0.6
Average monthly benefit	\$2,732	\$2,689	1.6%
Number in suspended status	10	8	25.0%
Disabled participants:			
Number in pay status	237	239	-0.8%
Average age	62.6	62.2	0.4
Average monthly benefit	\$1,891	\$1,841	2.7%
Beneficiaries:			
Number in pay status	795	771	3.1%
Average age	74.9	73.8	1.1
Average monthly benefit	\$1,629	\$1,585	2.8%

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

Age	Years of Service									
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39	40 & over
Under 25	73	73	--	--	--	--	--	--	--	--
	\$33,264	\$33,264	--	--	--	--	--	--	--	--
25 - 29	328	312	15	1	--	--	--	--	--	--
	38,633	38,358	\$44,902	\$30,434	--	--	--	--	--	--
30 - 34	343	246	61	36	--	--	--	--	--	--
	39,540	37,159	46,582	43,881	--	--	--	--	--	--
35 - 39	355	183	73	81	18	--	--	--	--	--
	43,886	39,595	47,709	49,409	\$47,156	--	--	--	--	--
40 - 44	460	175	87	101	75	22	--	--	--	--
	45,116	38,426	46,477	49,315	50,561	\$55,124	--	--	--	--
45 - 49	572	202	78	103	73	84	30	2	--	--
	47,040	39,057	45,648	49,868	49,664	58,751	\$55,682	\$44,588	--	--
50 - 54	637	153	75	91	87	107	107	17	--	--
	47,652	38,258	46,192	46,540	47,049	54,838	55,467	53,252	--	--
55 - 59	504	98	51	86	77	69	94	26	3	--
	49,056	39,473	46,432	46,446	49,999	53,998	56,786	54,017	\$58,359	--
60 - 64	298	49	37	50	52	46	38	18	4	4
	50,208	40,973	43,462	45,310	52,040	51,446	61,631	56,596	97,157	\$64,718
65 - 69	84	7	8	17	15	13	6	7	8	3
	52,124	41,614	37,872	47,429	58,756	56,546	56,774	66,059	56,787	34,678
70 & over	34	--	--	10	5	6	2	7	1	3
	46,534	--	--	42,845	43,031	46,095	51,039	51,391	39,998	53,387
Total	3,688	1,498	485	576	402	347	277	77	16	10
	\$45,527	\$38,330	\$46,073	\$47,672	\$49,781	\$55,099	\$56,780	\$55,062	\$66,125	\$52,307

EXHIBIT C – RECONCILIATION OF PARTICIPANT DATA

	Active Participants	Inactive Vested Participants ¹	Deferred Beneficiaries	Disableds	Retired Participants	Beneficiaries	Total
Number as of July 1, 2016	3,452	71	0	239	2,864	771	7,397
New participants ²	554	N/A	0	N/A	N/A	N/A	554
Terminations – with vested rights	-37	37	0	0	0	0	0
Terminations – without vested rights	-93	N/A	0	N/A	N/A	N/A	-93
Retirements	-79	-3	0	N/A	82	N/A	0
New disabilities	-5	-1	0	6	N/A	N/A	0
Return to work	8	-8	0	0	0	N/A	0
Died	-7	-3	0	-12	-85	-39	-146
New beneficiaries	0	0	1	0	0	66	67
Lump sum payoffs	-105	-5	0	0	0	0	-110
Certain period expired	N/A	N/A	0	0	0	-3	-3
Data adjustments ³	<u>0</u>	<u>1</u>	<u>0</u>	<u>4</u>	<u>-4</u>	<u>0</u>	<u>1</u>
Number as of July 1, 2017	3,688	89	1	237	2,857	795	7,667

¹ Excludes terminated participants with contributions remaining in the plan.

² 248 of the 554 new active participants included in the data for the first time this year have over one year of service.

³ The following data adjustments were made per the TPA:

One healthy retiree was included for the first time with this valuation.

Four annuitants listed as healthy retirees last year were changed to disabled retirees this year.

One healthy annuitant's pension was rescinded and participant's status was therefore changed to vested former participant.

EXHIBIT D – 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	\$1,122,786,000	\$1,153,715,000
Contribution income:		
Employer contributions	\$53,817,000	\$54,236,000
Employee contributions	<u>18,243,000</u>	<u>19,173,000</u>
<i>Net contribution income</i>	<i>\$72,060,000</i>	<i>\$73,409,000</i>
Adjustment	\$0	\$5,706,000
Investment income:		
Asset appreciation	\$140,246,000	-\$3,791,000
Interest, dividends and other income	15,150,000	13,466,000
Less investment and administrative fees	<u>-4,286,000</u>	<u>-4,088,000</u>
<i>Net investment income</i>	<i><u>\$151,110,000</u></i>	<i><u>\$5,587,000</u></i>
Total income available for benefits	\$223,170,000	\$84,702,000
Less benefit payments	-\$116,536,000	-\$115,631,000
Change in reserve for future benefits	\$106,634,000	-\$30,929,000
Net assets at market value at the end of the year	\$1,229,420,000	\$1,122,786,000

EXHIBIT E – ASSET ALLOCATION AS OF JUNE 30, 2017

	General Employees	School Board	Total
1. Market value of assets as of July 1, 2016	\$1,122,786,000	\$123,876,000	\$1,246,662,000
2. Employer contributions	\$53,817,000	\$52,000,000	\$105,817,000
3. Employee contributions	<u>18,243,000</u>	<u>1,441,000</u>	<u>19,684,000</u>
4. Total contributions: (2) + (3)	72,060,000	53,441,000	125,501,000
5. Benefit payments and refunds	-\$116,536,000	-\$54,450,000	-\$170,986,000
6. Administrative expenses	<u>-1,148,000</u>	<u>-206,000</u>	<u>-1,354,000</u>
7. Total benefit payments and expenses: (5) + (6)	-\$117,684,000	-\$54,656,000	-\$172,340,000
8. Net cash flow: (4) + (7)	-\$45,624,000	-\$1,215,000	-\$46,839,000
9. Net investment return	152,258,000	16,735,000	168,993,000
10. Market value of assets as of July 1, 2017: (1) + (8) + (9)	\$1,229,420,000	\$139,396,000	\$1,368,816,000

EXHIBIT F – DEVELOPMENT OF THE FUND THROUGH JUNE 30, 2017

Year Ended June 30	Employer Contributions	Employee Contributions	Net Investment Return ¹	Benefit Payments	Market Value of Assets at Year-End	Actuarial Value of Assets at Year-End	Actuarial Value as a Percent of Market Value
2008	\$70,334,827	\$12,003,484	-\$27,014,531	\$77,432,362	\$833,507,259 ²	\$829,734,232 ²	99.55%
2009	69,990,896	10,745,574	-90,617,329	78,718,820	782,351,795	881,008,954	112.61%
2010	51,761,766	11,616,599	96,241,481	91,327,372	850,644,269	866,905,943	101.91%
2011	46,078,000	13,230,000	149,657,731	96,095,000	963,515,000	868,798,754	90.17%
2012	35,237,000	15,142,000	4,967,000	101,375,000	917,486,000	917,486,000	100.00%
2013	38,694,000	17,322,000	145,776,000	104,849,000	1,014,429,000	954,964,648	94.14%
2014	42,145,000	17,366,000	179,568,000	108,175,000	1,145,333,000	1,016,486,156	88.75%
2015	48,015,000	16,975,000	55,130,000	111,738,000	1,153,715,000	1,084,009,929	93.96%
2016	54,236,000	19,173,000	11,293,000 ³	115,631,000	1,122,786,000	1,146,863,597	102.14%
2017	53,817,000	18,243,000	151,110,000	116,536,000	1,229,420,000	1,212,852,870	98.65%

¹ On a market basis, net of investment fees and administrative expenses

² Before Auditor correction of \$37,444,215

³ Includes \$5,706,000 asset adjustment

EXHIBIT G – DEFINITIONS OF PENSION TERMS

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

Actuarial Accrued Liability for Actives:	The equivalent of the accumulated normal costs allocated to the years before the valuation date.
Actuarial Accrued Liability for Pensioners and Beneficiaries:	The single-sum value of lifetime benefits to existing pensioners and beneficiaries. This sum takes account of life expectancies appropriate to the ages of the annuitants and the interest that the sum is expected to earn before it is entirely paid out in benefits.
Actuarial Cost Method:	A procedure allocating the Actuarial Present Value of Future Benefits to various time periods; a method used to determine the Normal Cost and the Actuarial Accrued Liability that are used to determine the actuarially determined contribution.
Actuarial Gain or Loss:	A measure of the difference between actual experience and that expected based upon a set of Actuarial Assumptions, during the period between two Actuarial Valuation dates. Through the actuarial assumptions, rates of decrements, rates of salary increases, and rates of fund earnings have been forecasted. To the extent that actual experience differs from that assumed, Actuarial Accrued Liabilities emerge which may be the same as forecasted, or may be larger or smaller than projected. Actuarial gains are due to favorable experience, e.g., 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 in actuarial liabilities that are larger than projected. Actuarial gains will shorten the time required for funding of the actuarial balance sheet deficiency while actuarial losses will lengthen the funding period.
Actuarially Equivalent:	Of equal actuarial present value, determined as of a given date and based on a given set of Actuarial Assumptions.
Actuarial Present Value (APV):	<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"> Adjusted for the probable financial effect of certain intervening events (such as changes in compensation levels, marital status, etc.) Multiplied by the probability of the occurrence of an event (such as survival, death, disability, withdrawal, etc.) on which the payment is conditioned, and Discounted according to an assumed rate (or rates) of return to reflect the time value of money.

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

Assumptions or Actuarial Assumptions:	The estimates 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; <u>Mortality rates</u> - the death rates of employees and pensioners; life expectancy is based on these rates; <u>Retirement rates</u> - the rate or probability of retirement at a given age or service; <u>Disability rates</u> – the probability of disability retirement at a given age; <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; <u>Salary increase rates</u> - the rates of salary increase due to inflation and productivity growth.
Closed Amortization Period:	A specific number of years that is counted down by one each year, and therefore declines to zero with the passage of time. For example, if the amortization period is initially set at 30 years, it is 29 years at the end of one year, 28 years at the end of two years, etc. See Open Amortization Period.
Decrements:	Those causes/events due to which a member's status (active-inactive-retiree-beneficiary) changes, that is: death, retirement, disability, or withdrawal.
Defined Benefit Plan:	A retirement plan in which benefits are defined by a formula applied to the member's compensation and/or years of service.
Defined Contribution Plan:	A retirement plan, such as a 401(k) plan, a 403(b) plan, or a 457 plan, in which the contributions to the plan are assigned to an account for each member, the plan's earnings are allocated to each account, and each member's benefits are a direct function of the account balance.
Employer Normal Cost:	The portion of the Normal Cost to be paid by the employer. This is equal to the Normal Cost less expected member contributions.
Experience Study:	A periodic review and analysis of the actual experience of the Fund that may lead to a revision of one or more actuarial assumptions. Actual rates of decrement and salary increases are compared to the actuarially assumed values and modified as deemed appropriate by the Actuary.
Funded Ratio:	The ratio of the actuarial value of assets (AVA) to the actuarial accrued liability (AAL). Plans sometimes calculate a market funded ratio, using the market value of assets (MVA), rather than the AVA.

GASB 67 and GASB 68:	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.
Investment Return:	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.
Net Pension Liability (NPL):	The Net Pension Liability is equal to the Total Pension Liability minus the Plan Fiduciary Net Position.
Normal Cost:	That portion of the Actuarial Present Value of pension plan benefits and expenses allocated to a valuation year by the Actuarial Cost Method. Any payment in respect of an Unfunded Actuarial Accrued Liability is not part of Normal Cost (see Amortization Payment). For pension plan benefits that are provided in part by employee contributions, Normal Cost refers to the total of employee contributions and employer Normal Cost unless otherwise specifically stated.
Open Amortization Period:	An open amortization period is one which is used to determine the Amortization Payment but which does not change over time. If the initial period is set as 30 years, the same 30-year period is used in determining the Amortization Period each year. In theory, if an Open Amortization Period 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.
Plan Fiduciary Net Position:	Market value of assets.
Total Pension Liability (TPL):	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.
Unfunded Actuarial Accrued Liability:	The excess of the Actuarial Accrued Liability over the Actuarial Value of Assets. This value may be negative, in which case it may be expressed as a negative Unfunded Actuarial Accrued Liability, also called the Funding Surplus.
Valuation Date or Actuarial Valuation Date:	The date as of which the value of assets is determined and as of which the Actuarial Present Value of Future Plan Benefits is determined. The expected benefits to be paid in the future are discounted to this date.

Section 4: Actuarial Valuation Basis

EXHIBIT I – ACTUARIAL ASSUMPTIONS AND ACTUARIAL COST METHOD

Rationale for Assumptions:	The information and analysis used in selecting each assumption that has a significant effect on this actuarial valuation is shown in the Review of Actuarial Experience for the five year period ended June 30, 2016 dated June 7, 2017.	
Net Investment Return:	7.25%, the investment return rate is assumed to be net of investment expenses. The net investment return assumption was chosen by the Pension Fund's Board of Trustees, with input from the actuary. This 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 Fund's target asset allocation.	
Administrative Expenses:	\$1,200,000 per year, projected annually with inflation The annual administrative expenses were based on historical and current data and adjusted to reflect estimated future experience and professional judgment.	
Salary Increases:	Age	Rate (%)
	Under 25	14.75
	25 - 29	11.75
	30 - 34	8.75
	35 - 39	6.75
	40 - 44	5.75
	45 - 49	5.00
	50 - 54	4.25
	55 - 59	3.75
	60 - 64	3.25
	65 & over	3.00
	<i>Salary increases include an assumed inflation rate of 2.25% and 0.75% productivity.</i>	
Vacation Pay Adjustment:	Retirement benefits are increased by 4% to reflect vacation pay.	
Payroll Growth:	3.00%, used to amortize the unfunded actuarial accrued liability as a level percentage of payroll.	

Cost-of-Living Adjustments:	2.25%, compounded annually for hires before November 1, 2011 1.00%, compounded annually for hires after October 31, 2011																																																					
Mortality Rates:																																																						
<i>Pre-retirement:</i>	Approximate RP-2006 Blue Collar Employee Table, loaded by 25% with sex-distinct rates and projected generationally with scale SSA2016-2D																																																					
<i>Healthy annuitants:</i>	Approximate RP-2006 Blue Collar Healthy Annuitant Table, loaded by 25% with sex-distinct rates and projected generationally with scale SSA2016-2D																																																					
<i>Disabled annuitants:</i>	Approximate RP-2006 Disabled Retiree Mortality Table, loaded by 25% with sex-distinct rates and projected generationally with scale SSA2016-2D																																																					
	Based on a five-year experience study for the period ended June 30, 2016, the above tables reasonably reflect the mortality experience of the Fund. The mortality tables are adjusted to future years using generational projection under scale SSA2016-2D to reflect expected mortality improvement.																																																					
Annuitant Mortality Rates:	<table border="1"> <thead> <tr> <th rowspan="3">Age</th> <th colspan="4">Rate (%)</th> </tr> <tr> <th colspan="2">Healthy*</th> <th colspan="2">Disabled*</th> </tr> <tr> <th>Male</th> <th>Female</th> <th>Male</th> <th>Female</th> </tr> </thead> <tbody> <tr> <td>55</td> <td>0.80</td> <td>0.52</td> <td>3.11</td> <td>1.88</td> </tr> <tr> <td>60</td> <td>1.12</td> <td>0.82</td> <td>3.51</td> <td>2.43</td> </tr> <tr> <td>65</td> <td>1.81</td> <td>1.32</td> <td>4.54</td> <td>3.16</td> </tr> <tr> <td>70</td> <td>2.98</td> <td>2.12</td> <td>6.10</td> <td>4.28</td> </tr> <tr> <td>75</td> <td>4.86</td> <td>3.44</td> <td>8.38</td> <td>6.14</td> </tr> <tr> <td>80</td> <td>7.98</td> <td>5.67</td> <td>11.78</td> <td>9.07</td> </tr> <tr> <td>85</td> <td>13.13</td> <td>9.75</td> <td>17.14</td> <td>13.56</td> </tr> <tr> <td>90</td> <td>21.64</td> <td>16.72</td> <td>25.57</td> <td>19.83</td> </tr> </tbody> </table> <p><i>*Rates shown do not include generational projection.</i></p>	Age	Rate (%)				Healthy*		Disabled*		Male	Female	Male	Female	55	0.80	0.52	3.11	1.88	60	1.12	0.82	3.51	2.43	65	1.81	1.32	4.54	3.16	70	2.98	2.12	6.10	4.28	75	4.86	3.44	8.38	6.14	80	7.98	5.67	11.78	9.07	85	13.13	9.75	17.14	13.56	90	21.64	16.72	25.57	19.83
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Mortality and Disability Rates before Retirement:

Age	Rate (%)			
	Mortality ¹		Ordinary Disability ²	
	Male	Female	Male	Female
20	0.08	0.03	0.00	0.00
25	0.09	0.03	0.00	0.00
30	0.08	0.03	0.00	0.00
35	0.09	0.04	0.09	0.09
40	0.12	0.07	0.14	0.13
45	0.20	0.11	0.22	0.20
50	0.32	0.16	0.37	0.32
55	0.48	0.24	0.64	0.54
60	0.80	0.39	0.95	0.66

¹Rates shown do not include generational projection.

²Occupational disability rates are 10% of the ordinary disability rates.

Termination Rates before Retirement:

Years of Service	Rate (%) ³
Less than 1	18.00
1	15.00
2	12.00
3	11.00
4	10.00
5	9.00
6	7.00
7	7.00
8	6.50
9	5.50
10	5.00
11	4.50
12	4.00
13	3.50
14	3.00
15 or more	2.50

³Withdrawal rates do not apply at or beyond the later of eligibility for early retirement or age 55.

Retirement Rates:

Less than 30 Years of Service		30 or More Years of Service	
Age	Rate	Age	Rate
50-52	2.0%	50-52	30.0%
53-54	3.0	53-54	30.0
55	5.0	55	30.0
56	6.0	56	30.0
57	6.0	57	35.0
58-59	7.0	58-59	35.0
60	20.0	60	35.0
61-64	15.0	61-64	20.0
65-66	25.0	65-66	25.0
67-68	15.0	67-68	25.0
69	25.0	69	25.0
70	100.0	70	100.0

The retirement rates were based on historical and current demographic data, adjusted to reflect 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 year's assumption over the five-year period ended June 30, 2016.

Retirement Age for Vested Inactive Participants:

Age 60

Unknown Data for Participants:

There were no records that were missing both service amounts and dates of hire.

Weighted Average Retirement Age:

Age 61.6, determined as follows: The weighted average retirement age for each participant is calculated as the sum of the product of each potential current or future retirement age times the probability of surviving from current age to that age and then retiring at that age, assuming no other decrements. The overall weighted retirement age is the average of the individual retirement ages based on all the active participants included in the July 1, 2017 actuarial valuation.

Percent Married:

75%

Age of Spouse:

Females are assumed to be three years younger than their male spouses.

Refunds of Employee Contributions for Terminated Vested Participants:	75% of participants hired before November 1, 2011 elect a refund of their employee contribution balances. 100% of participants hired after October 31, 2011 elect a refund of their employee contribution balances.
Actuarial Value of Assets:	Market value of assets less unrecognized returns in each of the last five years. Unrecognized return is equal to the difference between the actual market return and the expected return on the market value, and is recognized over a five-year period, further adjusted, if necessary, to be within 20% of the market value.
Actuarial Cost Method:	Entry Age Actuarial Cost Method. Entry Age is current age minus years of service. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis and are allocated by salary.
Justification for Change in Actuarial Assumptions:	<p>A comprehensive Actuarial Experience Review, covering the period July 1, 2011 through June 30, 2016, was completed in 2017. As a result of that study, the following assumption changes were proposed by the actuary and subsequently were approved by the Board in August 2017. These changes are reflected for the first time in this valuation.</p> <ul style="list-style-type: none"> ➤ The investment return assumption was lowered from 7.50% to 7.25%. ➤ The inflation assumption was lowered from 2.75% to 2.25%. ➤ The payroll growth assumption decreased from 3.50% to 3.00%, maintaining the productivity assumption of 0.75%. ➤ The age-based salary scale table was maintained with rates modified to reflect higher merit and promotional increases. ➤ The cost-of-living adjustment for hires before November 1, 2011 was decreased from 3.00% to 2.25%. There was no change in the 1.00% COLA assumption for hires after October 31, 2011. ➤ A flat administrative expense assumption of \$1,200,000, projected to increase annually with the inflation assumption, was introduced. ➤ The pre-retirement mortality assumption was changed from the sex-distinct RP-2000 Combined Healthy Mortality Table, to the approximate RP-2006 Blue Collar Employee Table, loaded by 25% for males and females. ➤ The post-retirement mortality assumption for healthy annuitants was changed from the sex-distinct RP-2000 Combined Healthy Mortality Table, to the approximate RP-2006 Blue Collar Healthy Annuitant Table, loaded by 25% for males and females. ➤ The mortality assumption for disabled retirees was changed from the sex-distinct RP-2000 Disabled Retiree Mortality Table, to the approximate RP-2006 Disabled Retiree Table, loaded by 25% for males and females. ➤ In conjunction with the revised mortality tables, a sex-distinct generational projection of scale SSA2016-2D was introduced for all lives.

- The retirement rates for participants with 30 or more years of service were decreased for ages 53 to 64; the current assumption for participants with less than 30 years of service at retirement was left unchanged.
- The sex-distinct ordinary disability rates were lowered to 80% of the existing age-based rates. The occupational disability assumption of 10% of ordinary disability rates was maintained.
- The existing gender-neutral, service-based withdrawal rates were maintained with decreases only in the rates for participants with less than two years of service.
- The assumption that 50% of terminated participants hired prior to November 1, 2011 will take a refund of contributions was increased to 75%; there was no change in the 100% assumption for terminated participants hired after October 31, 2011.

EXHIBIT II – SUMMARY OF PLAN PROVISIONS

This exhibit summarizes the major provisions of the City of Atlanta General Employees’ Pension Fund included in the valuation. It is not intended to be, nor should it be interpreted as, a complete statement of all plan provisions.

Plan Year:	July 1 through June 30
Plan Status:	Ongoing
Normal Pension:	
<i>Eligibility:</i>	
<i>Hired before July 1, 2010</i>	Age 60 after completing 10 years of service.
<i>Hired between July 1, 2010 and October 31, 2011</i>	Age 60 after completing 15 years of service.
<i>Hired after October 31, 2011</i>	Age 62 after completing 15 years of service.
<i>Monthly Amount:</i>	
<i>Hired before July 1, 2010</i>	2.5% of average monthly salary for each year of service.
<i>Hired between July 1, 2010 and October 31, 2011</i>	2.0% of average monthly salary for each year of service.
<i>Hired after October 31, 2011</i>	1.0% of average monthly salary for each year of service. This amount cannot be less than \$12 per month for each year of service, capped at 80% of average monthly salary.
<i>Average Monthly Salary:</i>	
<i>Hired before November 1, 2011</i>	Average of the highest consecutive 36 months of salary
<i>Hired after October 31, 2011</i>	Average of the highest consecutive 120 months of salary
<i>Normal Form of Payment:</i>	
<i>Hired prior to November 1, 2011</i>	75% Joint-and-Survivor (no reduction in benefit for providing survivor coverage)
<i>Hired after October 31, 2011</i>	Single life annuity

Early Retirement:*Service Requirement**Hired before July 1, 2010*

10 years of service

Hired between July 1, 2010

15 years of service

*and October 31, 2011**Hired after October 31, 2011*

Age 52 and 15 years of service

*Monthly Amount**Hired before November 1, 2011*

Normal pension monthly amount reduced by ½ of 1% per month for the first 60 months and by ¼ of 1% per month for the remaining months by which age at retirement is less than 60. More favorable early retirement adjustments may apply to participants in prior plans. Unreduced early retirement is available with 30 years of service.

Hired after October 31, 2011

Normal pension monthly amount reduced by ½ of 1% per month before age 62.

Disability:*Service Requirement*

5 years of service for non-job-related disability. None for job related disability.

Monthly Amount

Normal pension based on service accrued and final average salary at disability, payable immediately; cannot be less than 50% of average monthly salary. This amount is payable until attainment of normal retirement age at which time the benefit is recalculated to include years while disabled as years of service.

Vesting:

An employee who terminates employment may receive a percentage of the accrued benefit payable at normal retirement as determined below:

Completed Years of Service (hired before July 1, 2010)	Completed Years of Service (hired after June 30, 2010)	Percentage Vested*
Less than 5	Less than 10	0%
5	10	25
6	11	30
7	12	35
8	13	40
9	14	45
10 or more	15 or more	100

*A participant is always 100% vested in their contributions to the Plan.

Termination:	A participant terminating employment may elect a refund of their own contributions with interest. A refund will cause the forfeiture of any other vested accrued benefit from the Plan.		
Death Benefits:	<p>If a participant dies prior to attainment of eligibility for retirement, a lump sum of contributions with interest is payable to a beneficiary or estate.</p> <p>If an active participant who is eligible to retire, or a retired participant, dies, 75% of the accrued pension benefit is payable to the beneficiary. Eligible beneficiaries are the spouse or unmarried children under 23 (18 if not in post-secondary school).</p>		
Credited Service:	Service is credited for employment as a general employee of the City of Atlanta. Additional credit is granted for accumulated sick leave if hired prior to November 1, 2011 and for other prior service as specified in the plan.		
Participation:	All employees of the City of Atlanta, excluding temporary employees, firefighters, police officers, and employees hired after 2001 in job grades 19 and above.		
Employee Contributions:		% of Base Salary	
	Employee	Hired before November 1, 2011*	Hired after October 31, 2011*
	Unmarried employees without beneficiaries	12%	8%
	Unmarried employees with beneficiaries	13%	8%
	Married employees	13%	8%
	<i>*Excludes employees hired prior to January 1, 1984.</i>		
Interest on Employee Contributions:	Employee contributions earn 5% interest each year.		
Cost of Living Provision:	Benefits are adjusted annually on January 1 of each year based on the change in the Consumer Price Index from November 1 through October 31 of the preceding year.		
<i>Hired before November 1, 2011</i>	Such annual adjustment cannot exceed 3%.		
<i>Hired after October 31, 2011</i>	Such annual adjustment cannot exceed 1%.		
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.		

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