

City of Birmingham Retirement and Relief System

Actuarial Valuation and Review

As of July 1, 2019



This report has been prepared at the request of the Board to assist in administering the Retirement and Relief System. This valuation report may not otherwise be copied or reproduced in any form without the consent of the Board and may only be provided to other parties in its entirety, unless expressly authorized by Segal. The measurements shown in this actuarial valuation may not be applicable for other purposes.

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June 26, 2020

Board of Managers
City of Birmingham Retirement and Relief System
710 North 20th Street, GA 100 City Hall
Birmingham, Alabama 35203-2216

Dear Board Members:

We are pleased to submit this Actuarial Valuation and Review as of July 1, 2019. It summarizes the actuarial data used in the valuation, analyzes the preceding year's experience, and establishes the funding requirements for the 2019-2020 fiscal year.

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 and Relief System. The census information on which our calculations were based was prepared by the City and the financial information was provided by the City's Finance Department. That assistance is gratefully acknowledged.

The actuarial calculations were directed under the supervision of Deborah K. Brigham, FCA, ASA, MAAA, Enrolled Actuary. 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 of Managers are reasonably related to the experience of and the expectations for the System.

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

Sincerely,
Segal

A handwritten signature in black ink, appearing to read "L. Joyner".

Leon F. (Rocky) Joyner, Jr., FCA, ASA, MAAA, EA
Senior Vice President and National Public Sector
Retirement Practice Leader

A handwritten signature in black ink, appearing to read "Deborah K. Brigham".

Deborah K. Brigham, FCA, ASA, MAAA, EA
Senior Vice President and Actuary

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Actuarial Valuation Summary

Purpose and basis

This report was prepared by Segal to present a valuation of the City of Birmingham Retirement and Relief System as of July 1, 2019. The valuation was performed to determine whether the assets and contribution 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 System assets to cover the estimated cost of settling the System'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.

The contribution requirements presented in this report are based on:

- The benefit provisions of the Pension Plan, as administered by the Board of Managers;
- The characteristics of covered active participants, inactive vested participants, and retired participants and beneficiaries as of June 30, 2019, provided by the City;
- The assets of the Plan as of June 30, 2019, provided by the City's Finance Department;
- Economic assumptions regarding future salary increases and investment earnings; and
- Other actuarial assumptions regarding employee terminations, retirement, death, etc.

The assumptions and methods used to value the Plan were approved by the Board of Managers based on a five-year experience study for the period ended June 30, 2015. The City is due for another experience study prior to the completion of the next valuation.

Certain disclosure information required by GASB Statements No 67 and 68 as of June 30, 2019 for the Retirement and Relief System has been provided in a separate report.

Section 1: Actuarial Valuation Summary

Significant issues

This actuarial valuation is based on plan assets as of June 30, 2019. Due to the COVID-19 pandemic, market conditions have changed significantly since the valuation date. The Retirement and Relief System's actuarial status does not reflect short-term fluctuations of the market, but rather is based on the market values on the last day of the Plan Year. While it is impossible to determine how the market will perform over the next several months, and how that will affect the results of next year's valuation, Segal is available to prepare projections of potential outcomes upon request.

1. The actuarially determined employer contribution for the upcoming year is \$32.2 million, an increase of \$1.0 million from last year. The contribution as a percentage of payroll increased from 14.96% of pay to 16.06% of pay, based on a 30-year level percent-of-pay amortization of the unfunded actuarial accrued liability. Not only did the required dollars increase, but the total covered payroll decreased by 3.8%. The lower payroll accounts, in part, for the increase in the contribution as a percent of payroll.
2. Actual City contributions made during the fiscal year ending June 30, 2019 were \$16.9 million, 54.4%% of the actuarially determined contribution. In the prior fiscal year, actual contributions were \$14.7 million, 49.0% of the prior year actuarially determined contribution.
3. 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 (the cost of benefits accruing during the year), interest on the unfunded actuarial accrued liability and the principal balance. The current contribution levels do not meet this standard. Although the normal cost is covered by the City and member contributions, the remaining contribution income is insufficient to amortize the unfunded actuarial accrued liability. The unfunded liability increased from \$404.2 million to \$437.5 million on an actuarial basis over the past year, and it is projected to continue to climb in the future.
4. The City's contribution rate increased from 8.50% of pay to 12.00% of pay effective July 1, 2019. The employees contribute 7.00% of pay. **There is a deficit of 4.06% of pay between these contribution rates and the actuarially determined contribution requirements.** Each year that contributions fall short of the required amount, the System experiences a loss. This year that loss was \$13.2 million. The City should continue to seek ways to restore balance between the System's benefits and the resources available to pay for them. Segal is available to discuss a funding policy with the Board and City staff, including a targeted amortization period for amortizing the unfunded liability.
5. The funded ratio (the ratio of the actuarial value of assets to actuarial accrued liability) is one measure of funding status, and its history is a measure of funding progress. This ratio dropped from 72.51% to 70.86% between July 1, 2018 and July 1, 2019. Using the market value of assets, the funded ratio is 69.46%, a decrease from 71.79% as of the prior valuation date. These measurements are not necessarily appropriate for assessing the sufficiency of System assets to cover the estimated cost of settling the System's benefit obligation or the need for or the amount of future contributions.
6. The rate of return on the market value of assets was 4.78% for the plan year ended June 30, 2019. The return on the actuarial value of assets was 5.74% for the same period due to the recognition of prior years' investment gains and losses. This resulted in an actuarial loss of \$18.3 million when measured against the assumed rate of return of 7.50%. 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

Section 1: Actuarial Valuation Summary

investments of 7.50%. If the assumption were 7.00% in this valuation, the City's actuarially determined employer contribution would be 19.12% of payroll, and the contribution shortfall would be 7.12% of payroll.

7. The net actuarial gain from sources other than investments or contributions was \$1.9 million, or 0.1% of actuarial accrued liability.
8. The assumption for administrative expenses increased from \$260,000 to \$275,000 for the year beginning July 1, 2019.
9. Reflected for the first time with this valuation is the enactment of House Bill 397 (H.B.397), permitting the City to rehire retired public safety retirees in periods of critical personnel shortages. Under this Bill, rehired retirees continue to receive their pension benefits, but do not accrue additional service credit. Contributions are made by the City and by the rehired retirees.

As of the valuation date, 45 Fire and Police retirees had been reemployed by the City under the provisions of H.B.397. Of these, 60% retired and were rehired during the 2018-2019 plan year. For determination of liability and in headcounts in this valuation, the 45 individuals are included as retirees of either the Supplemental System or the Retirement and Relief System, as appropriate. However, their salaries are included in total payroll in the calculation of expected employee contributions and the City's actuarially determined contribution as a percentage of pay.

10. The System uses the Entry Age Cost Method with the normal cost determined on an "ultimate" basis. This methodology allows changes in the plan of benefits for new hires to be reflected in the normal cost for current employees even though the plan of benefits for current employees is unchanged. As a result, the actuarial accrued liability increases to offset the decrease in normal cost, and the actuarially determined contribution is less than it would be if the "ultimate" approach was not used. A proposed new Actuarial Standard of Practice (ASOP) excludes this actuarial cost method as an option for actuaries to use in plan funding. If the cost method were changed to "traditional" Entry Age, and the rate of return assumption remained at 7.50%, the actuarially determined employer contribution rate would climb from 16.06% of pay to 17.19%.
11. This report constitutes an actuarial valuation for the purpose of determining the actuarially determined contribution under the City's 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, 2020, will be provided separately. The accounting disclosures will be based on the data, assumptions and provisions utilized in this report, but will reflect different methodologies from those employed in the funding valuation, as required by the GASB. However, the actuarially determined contribution in this valuation is expected to be used as the actuarially determined contribution (ADC) for GASB financial reporting.
12. 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. Segal has not been engaged to perform a detailed analysis of the potential range of the impact of risk relative to the System's future financial condition, but a brief discussion of some risks that may affect the System is included in Section 2, and deterministic projections of assets, contributions, and funding levels have been provided to the Board separately. A more detailed assessment would provide the Board with a better understanding of the inherent risks. As noted above, this could be important because actual contributions have been less than the ADC for many years, which has led to funding challenges. As changes are under consideration, detailed modelling would provide the Board and the City with information related to the probabilities of long-term success in balancing the assets and the liabilities.

Section 1: Actuarial Valuation Summary

Summary of key valuation results

		2019	2018
Contributions for plan year beginning July 1:	• Actuarially determined employer contribution	\$32,166,230	\$31,146,931
	• Actuarially determined employer contribution as a percent of payroll	16.06%	14.96%
	• Actual employer contributions	--	\$16,939,246
Actuarial accrued liability for plan year beginning July 1:	• Retired participants and beneficiaries	\$852,396,077	\$791,271,345
	• Inactive vested participants	123,605,148	118,120,924
	• Active participants	521,622,402	559,777,715
	• Inactive participants due a refund of employee contributions	3,757,869	1,081,143
	• Total actuarial accrued liability	1,501,381,496	1,470,251,127
	• Total normal cost, including administrative expenses	18,193,198	19,804,803
Assets for plan year beginning July 1:	• Market value of assets (MVA)	\$1,042,877,491	\$1,055,421,690
	• Actuarial value of assets (AVA)	1,063,878,399	1,066,035,625
	• Actuarial value of assets as a percentage of market value of assets	102.01%	101.01%
Funded status for plan year beginning July 1:	• Unfunded actuarial accrued liability on market value of assets	\$458,504,005	\$414,829,437
	• Funded percentage on MVA basis	69.46%	71.79%
	• Unfunded actuarial accrued liability on actuarial value of assets	\$437,503,097	\$404,215,502
	• Funded percentage on AVA basis	70.86%	72.51%
	• Effective amortization period on an AVA basis	Infinite	Infinite
Key assumptions	• Net investment return	7.50%	7.50%
	• Inflation rate	2.50%	2.50%
	• Payroll increase	2.50%	2.50%
Demographic data for plan year beginning July 1:	• Number of retired participants and beneficiaries	3,355	3,202
	• Number of inactive vested participants ¹	378	362
	• Number of active participants	3,659	3,893
	• Number of inactive participants due a refund of employee contributions	246	117
	• Total payroll ²	\$200,234,161	\$208,175,344
	• Average payroll ²	54,059	53,474

¹Includes future pensioners currently receiving benefits from the Supplemental System and excludes terminated participants due a refund of contributions.

²The total and average payroll includes \$2,847,692 in salaries for 45 Police and Fire retirees who have returned to work with the City as of June 30, 2019 under the provisions of H.B.397. However, for purposes of headcounts and liabilities, the 45 individuals are counted as retired participants of the Supplemental System or the Retirement and Relief System, as appropriate.

Section 1: Actuarial Valuation Summary

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 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 City. 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's Finance Department. 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.
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.

Section 1: Actuarial Valuation Summary

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 City or 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 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 System.

Actuarial Valuation Results

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. As can be seen below, the number of active participants is at its lowest level in the last decade.

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

Participant Population: 2010 – 2019

Year Ended June 30	Active Participants	Inactive Vested Participants ¹	Retired Participants and Beneficiaries	Total Non- Actives	Ratio of Non-Actives to Actives
2010	4,073	232	2,555	2,787	0.68
2011	3,807	246	2,803	3,049	0.80
2012	3,907	250	2,802	3,052	0.78
2013	3,901	283	2,834	3,117	0.80
2014	3,889	303	2,897	3,200	0.82
2015	3,871	351	2,924	3,275	0.85
2016	3,851	358	3,017	3,375	0.88
2017	3,904	370	3,118	3,488	0.89
2018	3,893	362	3,202	3,564	0.92
2019	3,659 ²	378	3,355	3,733	1.02

¹Includes future pensioners receiving benefits (including one suspended annuitant) from the Supplemental System, and excludes terminated participants due a refund of employee contributions.

²Public safety retirees who were rehired under H.B.397 are not included in the active participant count, but are counted as inactive vested or retired instead.

Section 2: Actuarial Valuation Results

Active participants

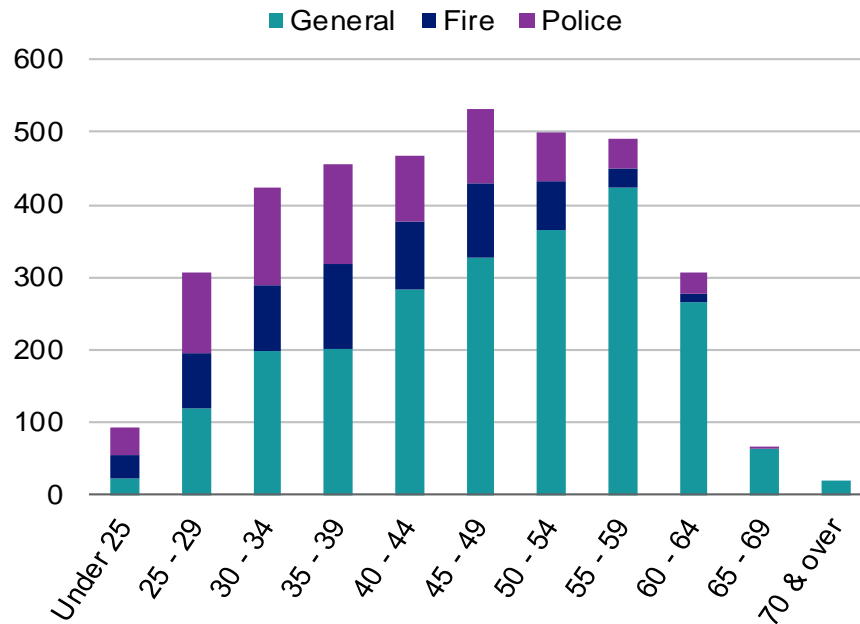
Plan costs are affected by the age, years of credited service and payroll of active participants. In this year's valuation, there were 3,659 active participants with an average age of 45.4, average years of credited service of 11.5 years and average payroll of \$53,945, exclusive of 45 rehired public safety retirees. The 3,893 active participants in the prior valuation had an average age of 45.4, average service of 11.7 years and average payroll of \$53,474.

Inactive participants

In this year's valuation, there were 378 participants with a vested right to a deferred or immediate vested benefit. This includes 323 individuals currently receiving benefits from the Firemen's and Policemen's Supplemental Pension System. In addition, there were 246 participants entitled to a return of their employee contributions.

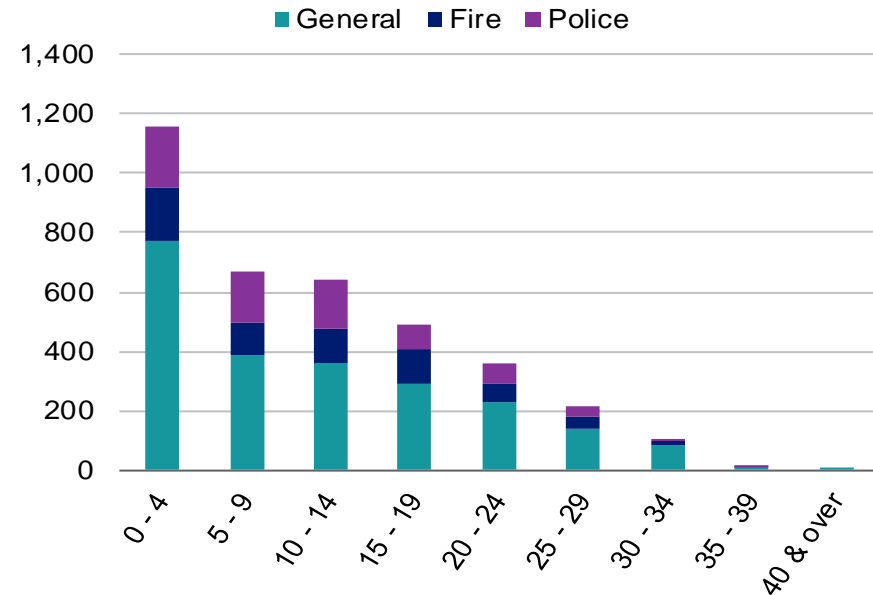
Distribution of Active Participants as of June 30, 2019

Actives by Age



Average age	45.4
Prior year average age	45.4
Difference	0.0

Actives by Years of Credited Service



Average years of credited service	11.5
Prior year average years of credited service	11.7
Difference	-0.2

Section 2: Actuarial Valuation Results

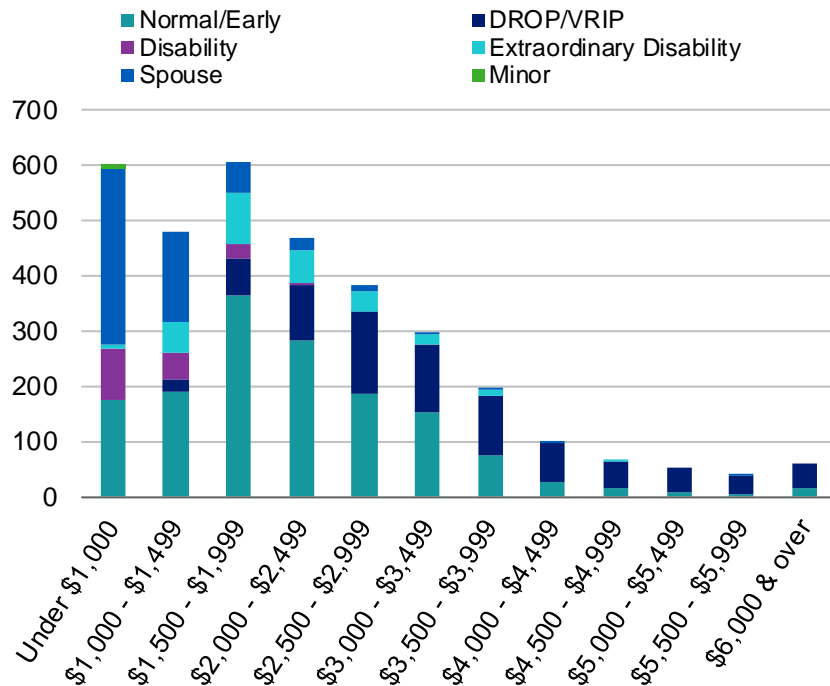
Retired participants and beneficiaries

As of June 30, 2020, 2,770 retired participants and 585 beneficiaries were receiving total monthly benefits of \$7,562,203. For comparison, in the previous valuation, there were 2,642 retired participants and 560 beneficiaries receiving monthly benefits of \$7,024,058.

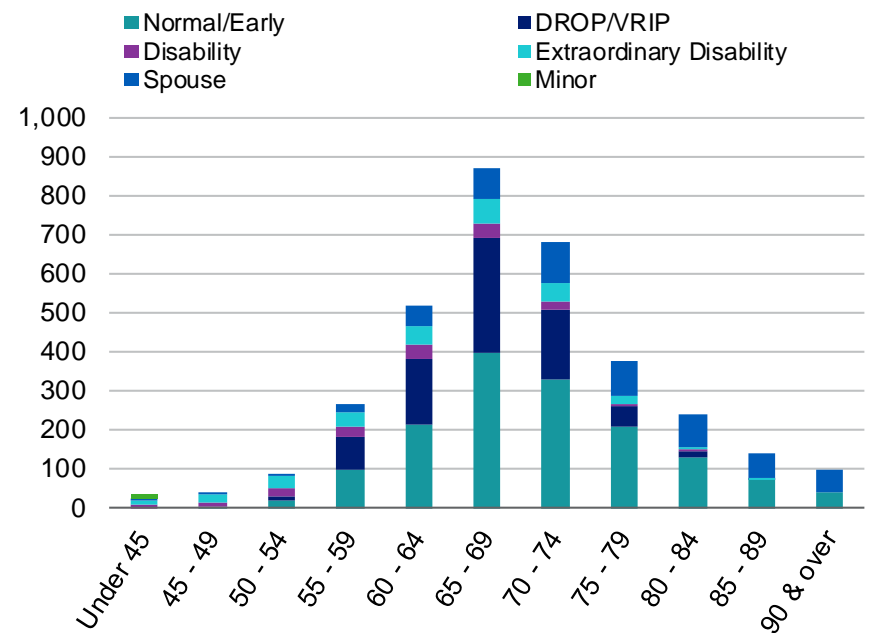
As of June 30, 2019, the average monthly benefit for retired participants and beneficiaries is \$2,254, compared to \$2,194 in the previous valuation. The average age for retired participants and beneficiaries is 69.9 in the current valuation, compared with 69.7 in the prior valuation.

Distribution of Pensioners and Beneficiaries as of June 30, 2019

Pensioners and Beneficiaries by Type and Monthly Amount



Pensioners and Beneficiaries by Type and Age



Section 2: Actuarial Valuation Results

Historical plan population

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

Participant Data Statistics: 2010 – 2019

Year Ended June 30	Active Participants			Retired Participants and Beneficiaries		
	Count	Average Age	Average Service	Count	Average Age	Average Monthly Amount
2010	4,073	44.7	11.9	2,555	67.8	\$1,828
2011	3,807	44.2	11.6	2,803	67.7	1,921
2012	3,907	44.5	11.7	2,802	68.1	1,953
2013	3,901	45.0	12.0	2,834	68.4	1,976
2014	3,889	45.0	11.9	2,897	68.7	2,024
2015	3,871	45.3	12.1	2,924	69.1	2,048
2016	3,851	45.3	11.9	3,017	69.3	2,085
2017	3,904	45.3	11.8	3,118	69.5	2,119
2018	3,893	45.4	11.7	3,202	69.7	2,194
2019	3,659	45.4	11.5	3,355	69.9	2,254

Section 2: Actuarial Valuation Results

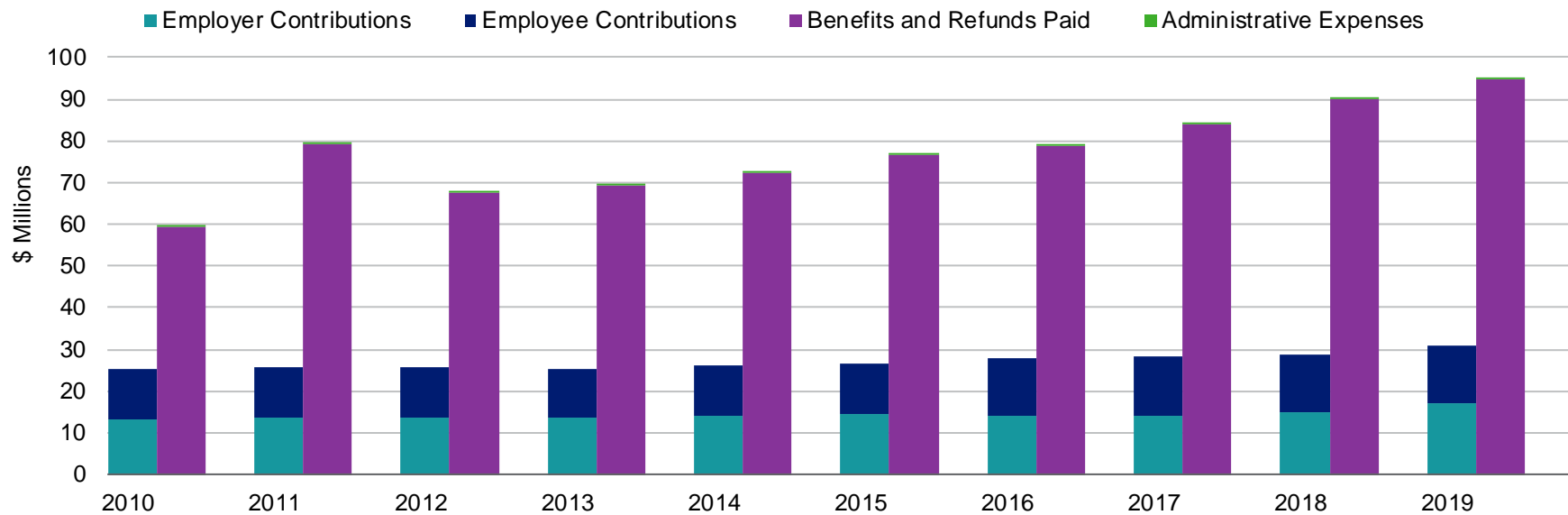
Financial information

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

Total contributions were \$33.5 million for the year ended June 30, 2019. Benefit payments and refunds totaled \$94.8 million, and are projected to increase over the next ten years. To the extent that future contributions are less than benefit payments, investment earnings or fund assets will be needed to cover the shortfall.

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, 2010 – 2019



Note: The Plan experienced a spike in benefit payments in the 2010-2011 plan year due to a voluntary retirement incentive program.

Section 2: Actuarial Valuation Results

It is desirable to have level and predictable plan costs from one year to the next. For this reason, the Board of Managers 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, 2019

1	Market value of assets, June 30, 2019				\$1,042,877,491
2	Calculation of unrecognized return	Original Amount¹	Percent Deferred	Unrecognized Amount²	
	(a) Year ended June 30, 2019	-\$27,859,475	80%	-\$22,287,580	
	(b) Year ended June 30, 2018	352,647	60	211,587	
	(c) Year ended June 30, 2017	38,226,369	40	15,290,548	
	(d) Year ended June 30, 2016	-71,077,315	20	-14,215,463	
	(e) Year ended June 30, 2015	-27,004,744	0	<u>0</u>	
	(f) Total unrecognized return				-21,000,908
3	Preliminary actuarial value: (1) - (2f)				\$1,063,878,399
4	Adjustment to be within 20% corridor				0
5	Final actuarial value of assets as of June 30, 2019: (3) + (4)				<u>1,063,878,399</u>
6	Actuarial value as a percentage of market value: (5) ÷ (1)				102.0%
7	Amount deferred for future recognition ³ : (1) - (5)				-\$21,000,908

¹Total return minus expected return on a market value basis

²Recognition at 20% per year over five years

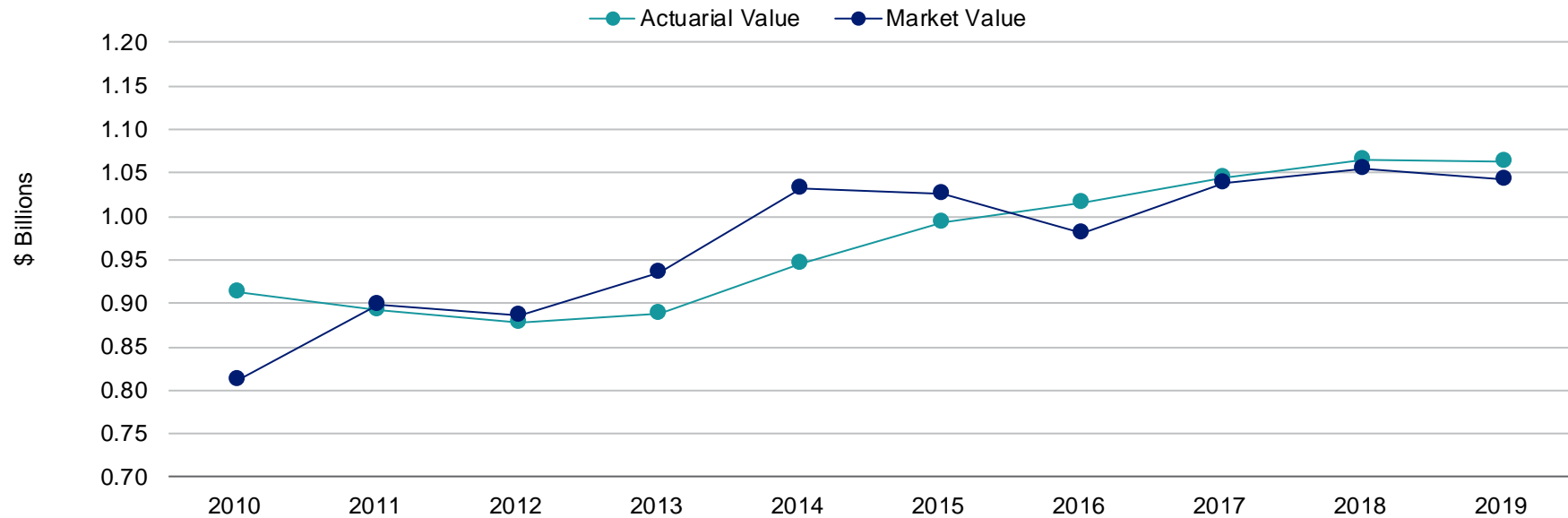
³Deferred return as of June 30, 2019 recognized in each of the next four years:

(a) Amount recognized on June 30, 2020	-\$12,071,555
(b) Amount recognized on June 30, 2021	2,143,908
(c) Amount recognized on June 30, 2022	-5,501,366
(d) Amount recognized on June 30, 2023	-5,571,895

Section 2: Actuarial Valuation Results

Both the actuarial value and market value of assets are representations of the System'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, 2010 – 2019



Section 2: Actuarial Valuation Results

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 loss is \$29,550,090, which includes \$18,268,547 from investment losses, \$13,204,973 from contribution losses and \$1,923,430 in net gains from all other sources. The net experience variation from individual sources other than investments or contributions was 0.1% 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, 2019

1	Net loss from investments ¹	-\$18,268,547
2	Net loss from administrative expenses	-20,932
3	Net loss from contributions	-13,204,973
4	Net gain from other experience	1,944,362
5	Net experience loss: 1 + 2 + 3 + 4	-\$29,550,090

¹Details on next page.

Section 2: Actuarial Valuation Results

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 4.78% for the year ended June 30, 2019.

For valuation purposes, the assumed rate of return on the actuarial value of assets is 7.50%. The actual rate of return on an actuarial basis for the 2018-2019 plan year was 5.74%. Since the actual return for the year was less than the assumed return, the System experienced an actuarial loss during the year ended June 30, 2019 with regard to its investments.

Investment Experience

	Year Ended June 30, 2019		Year Ended June 30, 2018	
	Market Value	Actuarial Value	Market Value	Actuarial Value
1 Net investment income	\$48,989,633	\$59,376,606	\$76,008,815	\$79,918,595
2 Average value of assets	1,024,654,774	1,035,268,709	1,008,748,910	1,015,453,065
3 Rate of return: 1 ÷ 2	4.78%	5.74%	7.53%	7.87%
4 Assumed rate of return	7.50%	7.50%	7.50%	7.50%
5 Expected investment income: 2 x 4	76,849,108	77,645,153	75,656,168	76,158,980
6 Actuarial gain/(loss): 1 - 5	<u>-\$27,859,475</u>	<u>-\$18,268,547</u>	<u>\$352,647</u>	<u>\$3,759,615</u>

Section 2: Actuarial Valuation Results

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: 2000 - 2019

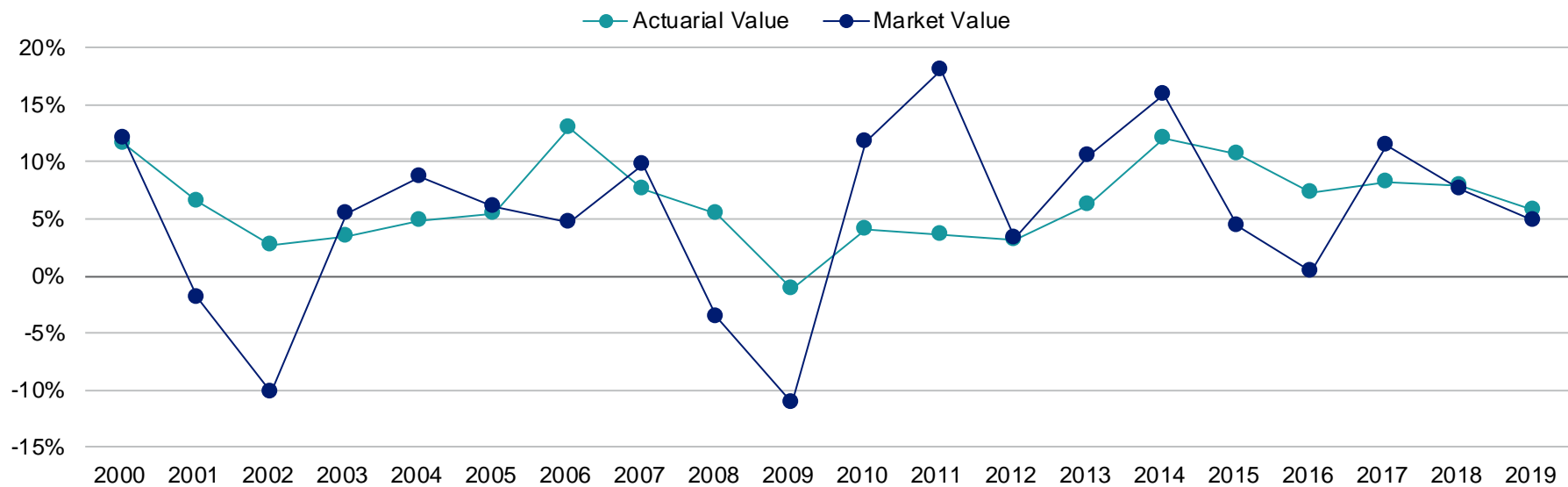
Year Ended June 30	Actuarial Value Investment Return		Market Value Investment Return		Year Ended June 30	Actuarial Value Investment Return		Market Value Investment Return		
	Amount	Percent	Amount	Percent		Amount	Percent	Amount	Percent	
2000	\$76,988,598	11.54%	\$99,628,658	12.01%	2010	\$36,877,809	4.12%	\$86,792,989	11.68%	
2001	47,724,275	6.51	-17,602,046	-1.92	2011	32,810,110	3.69	142,064,641	18.06	
2002	20,838,657	2.72	-89,504,028	-10.11	2012	28,060,905	3.22	29,540,542	3.36	
2003	26,222,740	3.41	42,649,330	5.48	2013	53,140,970	6.19	91,188,014	10.52	
2004	37,623,896	4.85	69,023,086	8.61	2014	104,147,855	12.02	144,761,454	15.85	
2005	43,262,778	5.48	50,973,808	6.02	2015	98,537,303	10.68	43,686,697	4.33	
2006	105,060,847	13.01	40,468,583	4.64	2016	71,387,926	7.36	4,081,529	0.41	
2007	66,843,172	7.55	86,398,586	9.76	2017	81,914,720	8.28	109,852,441	11.50	
2008	50,798,110	5.52	-33,654,898	-3.58	2018	79,918,595	7.87	76,008,815	7.53	
2009	-9,976,637	-1.06	-96,873,908	-11.09	2019	59,376,606	5.74	48,989,633	4.78	
							Most recent five-year average return		7.93%	5.65%
							Most recent ten-year average return		6.94%	8.45%
							Most recent 15-year average return		6.61%	6.06%
							Most recent 20-year average return		6.40%	5.21%

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

Section 2: Actuarial Valuation Results

As described earlier in this section, the actuarial asset valuation method 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, 2000 - 2019



Section 2: Actuarial Valuation Results

Contributions

City and employee contributions for the year ended June 30, 2019 totaled \$33,511,877, compared to the recommended amount of \$44,529,136. This resulted in a loss of \$13,204,973 for the year, when adjusted for timing.

Non-investment experience

Administrative expenses

- Administrative expenses for the year ended June 30, 2019 totaled \$280,245, as compared to the assumption of \$260,000. This resulted in a loss of \$20,932 for the year, when adjusted for timing. Based on an average of the most recent three years, the assumption has been increased from \$260,000 to \$275,000 for the year beginning July 1, 2019.

Mortality experience

- Mortality experience (more or fewer than expected deaths) yields actuarial gains or losses.
- The average number of deaths for nondisabled pensioners over the past four years was 57.25 per year, compared to 66.96 projected deaths per year. However, the number of deaths is too small to be fully statistically credible.

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),
- 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, 2019 amounted to \$1,944,362, which is 0.1% of the actuarial accrued liability.

Section 2: Actuarial Valuation Results

Actuarial assumptions

Assumed administrative expenses increased from \$260,000 to \$275,000 for the year beginning July 1, 2019. This is the only assumption change reflected this year. Details on actuarial assumptions and methods are in *Section 4, Exhibit I*.

The System undergoes an in-depth study every five years to compare the actuarial assumptions to actual experience, and the assumptions are updated as appropriate. The last experience review was completed for the five-year period ended June 30, 2015. The City is due for another experience study prior to the completion of the next valuation.

Plan provisions

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

The provisions of House Bill 397 (H.B.397) are reflected for the first time with this valuation. H.B.397 permits the City to rehire retired public safety retirees in periods of critical personnel shortages. Rehired retirees continue to receive their pension benefits, but do not accrue additional service credit. Contributions are made by the City and by the rehired retirees. The provisions of the bill are designed to make it cost-neutral. Segal will monitor the impact of any apparent changes in retirement patterns.

Contribution rates

The City's contribution rate increased from 8.50% to 12.00% of payroll effective July 1, 2019. The employee rate remains at 7.00% of pay.

Section 2: Actuarial Valuation Results

Development of Unfunded Actuarial Accrued Liability for Year Ended June 30, 2019

1	Unfunded actuarial accrued liability at beginning of year	\$404,215,502
2	Total normal cost at beginning of year, including administrative expenses	19,804,803
3	Total contributions	-33,511,877
4	Interest	
	• For whole year on 1 + 2	\$31,801,523
	• For half year on 3	<u>-1,151,971</u>
	Total interest	<u>30,649,552</u>
5	Expected unfunded actuarial accrued liability	\$421,157,980
6	Changes due to experience gains and losses	<u>\$16,345,117</u>
7	Unfunded actuarial accrued liability at end of year	<u>\$437,503,097</u>

Section 2: Actuarial Valuation Results

Actuarially determined contribution

The actuarially determined contribution shown in this section reflects the City's contribution, net of expected 7.00% of payroll contributions from employees. This contribution is equal to the employer normal cost payment and a payment on the unfunded actuarial accrued liability. As of July 1, 2019, the actuarially determined contribution is \$32,166,230, or 16.06% of payroll.

Currently, the City contributes 12.00% of pay to the System. The net employer normal cost rate for the System, including administrative expenses, is 2.09% of pay before adjustment for timing. After paying the normal cost, the remaining City contributions are insufficient to amortize the unfunded actuarial accrued liability. The City should continue to seek ways to restore balance between the System's benefits and the resources available to pay for them.

The contribution requirement as of July 1, 2019 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.

Actuarially Determined Employer Contribution for Year Beginning July 1

	2019		2018	
	Amount	% of Payroll	Amount	% of Payroll
1. Total normal cost ¹	\$17,928,705	8.96%	\$19,554,737	9.39%
2. Administrative expenses	264,493	0.13%	250,066	0.12%
3. Expected employee contributions	<u>-14,016,391</u>	<u>-7.00%</u>	<u>-14,572,274</u>	<u>-7.00%</u>
4. Employer normal cost: (1) + (2) + (3)	\$4,176,806	2.09%	\$5,232,529	2.51%
5. Actuarial accrued liability	\$1,501,381,496		\$1,470,251,127	
6. Actuarial value of assets	1,063,878,399		1,066,035,625	
7. Unfunded actuarial accrued liability: (5) - (6)	\$437,503,097		\$404,215,502	
8. Payment on unfunded actuarial accrued liability	26,760,410	13.36%	24,724,333	11.88%
9. Adjustment for timing ²	<u>1,229,014</u>	<u>0.61%</u>	<u>1,190,069</u>	<u>0.57%</u>
10. Total actuarially determined contribution: (4) + (8) + (9)	<u>\$32,166,230</u>	<u>16.06%</u>	<u>\$31,146,931</u>	<u>14.96%</u>
11. Total payroll ³	\$200,234,161		\$208,175,344	

¹Reflects offset for expected contributions on behalf of Supplemental System retirees, amounting to \$3,174,558 as of July 1, 2019 and \$2,917,766 as of July 1, 2018 (\$3,053,264 and \$2,806,284 when adjusted for timing).

²Recommended contributions are assumed to be paid at the beginning of every month.

³Includes \$2,847,692 in salary for the 45 public safety retirees who were rehired under the provisions of H.B.397 as of June 30, 2019.

Section 2: Actuarial Valuation Results

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 from July 1, 2018 to July 1, 2019

	Amount	% of Payroll
Actuarially Determined Contribution as of July 1, 2018	\$31,146,931	14.96%
• Effect of investment loss	1,179,944	0.57%
• Effect of other gains and losses on accrued liability	-124,232	-0.06%
• Effect of contributions less than actuarially determined contribution	852,893	0.41%
• Effect of expected change in amortization payment due to payroll growth	642,663	0.31%
• Effect of maintaining a rolling 30-year amortization period	-905,405	-0.43%
• Effect of employee contributions from retirees who returned to work	-207,257	-0.10%
• Effect of change in administrative expense assumption	15,000	0.00%
• Net effect of other changes, including composition and number of participants	<u>-434,307</u>	<u>-0.21%</u>
Total change	\$1,019,299	0.49%
Total change in percentage due to compensation change		0.61%
Actuarially Determined Contribution as of July 1, 2019	\$32,166,230	16.06%

Section 2: Actuarial Valuation Results

History of employer contributions

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

History of Employer Contributions: 2011 – 2020

Fiscal Year Ended June 30	Actuarially Determined Employer Contribution (ADEC)¹	Actual Employer Contribution	Percent Contributed
2011	\$18,147,790	\$13,772,490	75.89%
2012	18,904,668	13,676,554	72.34%
2013	20,516,938	13,591,846	66.25%
2014	30,553,712	14,039,103	45.95%
2015	30,398,187	14,464,552	47.58%
2016	29,898,918	13,837,061	46.28%
2017	30,564,212	14,040,165	45.94%
2018	30,063,990	14,724,092	48.98%
2019	31,146,931	16,939,246	54.38%
2020	32,166,230	--	--

¹Prior to July 1, 2013, this amount was the Annual Required Contribution (ARC) and was calculated presuming that the employees would be responsible for an equal share of the cost of the System. However, if employee contribution rates were insufficient to cover half of the cost, the City was ultimately responsible for the funding of the System. Beginning July 1, 2013, the Actuarially Determined Employer Contribution (ADEC) is equal to the total calculated contribution in the most recent actuarial valuation, minus the portion expected to be covered by employee contributions.

Section 2: Actuarial Valuation Results

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 Plan. A more detailed assessment would provide the Board with a better understanding of the risks inherent in the Plan. This assessment may include scenario testing, sensitivity testing, stress testing and stochastic modeling.

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

The market value rate of return over the last 20 years has ranged from a low of -11.09% to a high of 18.06%.

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

Plan contributions are set by statute, but the City can budget more than the statutory rate. When the City and employee contribution rates are insufficient to amortize the unfunded liabilities, the long-term health of the System will suffer. Periodic projections comparing expected statutory contributions with the projected actuarially determined contributions should be developed to determine if the contributions are sufficient to fund the System and to ensure the payment of promised benefits. Deterministic projections have been provided to the Board separately.

- 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.

- 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.

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

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

The investment gain/loss for a year has ranged from a loss of \$33,034,851 to a gain of \$43,484,694.

The non-investment gain/loss for a year has ranged from a loss of \$23,002,953 to a gain of \$14,066,195.

Section 2: Actuarial Valuation Results

The funded percentage on the actuarial value of assets has ranged from a low of 70.9% to a high of 82.0% since 2010.

While it is difficult to quantify the impact of potential experience, for the Retirement and Relief System, each 1% change in the actuarial cost factors would result in a change in the recommended contribution of \$1.1 million.

- 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 1.02. For the prior year benefits and administrative expenses paid were \$61,533,832 more than contributions received. As the System matures, more cash will be needed from the investment portfolio to meet benefit payments.

Section 2: Actuarial Valuation Results

Volatility ratios

Retirement plans are subject to volatility in the level of required contributions. This volatility tends to increase as retirement plans become more mature.

The Asset Volatility Ratio (AVR), which is equal to the market value of assets divided by total payroll, provides an indication of the potential contribution volatility for any given level of investment volatility. A higher AVR indicates that the plan is subject to a greater level of contribution volatility. This is a current measurement since it is based on the current level of assets.

The current AVR is about 5.2. This means that a 1% asset gain or loss (relative to the assumed investment return) translates to about 5.2% of one-year's payroll. Since actuarial gains and losses are amortized over 30 years, there would be a 0.33% of payroll decrease/(increase) in the required contribution for each 1% asset gain or loss. The Liability Volatility Ratio (LVR), which is equal to the Actuarial Accrued Liability divided by payroll, provides an indication of the longer-term potential for contribution volatility for any given level of investment volatility. This is because, over an extended period of time, the plan's assets should track the plan's liabilities. For example, if a plan is 50% funded on a market value basis, the liability volatility ratio would be double the asset volatility ratio and the plan sponsor should expect contribution volatility to increase over time as the plan becomes better funded.

The LVR also indicates how volatile contributions will be in response to changes in the Actuarial Accrued Liability due to actual experience or to changes in actuarial assumptions. The current LVR is about 7.5. This is about 44% higher than the AVR. Therefore, we would expect that contribution volatility will increase over the long term.

Volatility Ratios for Years Ended 2010 - 2019

Year Ended June 30	Asset Volatility Risk	Liability Volatility Risk
2010	4.2	5.8
2011	5.1	6.5
2012	4.9	6.5
2013	5.1	6.7
2014	5.4	6.6
2015	5.2	6.7
2016	4.9	6.7
2017	5.1	7.0
2018	5.1	7.1
2019	5.2	7.5

Supplemental Information

Exhibit A: Table of Plan Coverage

Category	Year Ended June 30		Change From Prior Year
	2019	2018	
Active participants in valuation:			
• Number	3,659	3,893	-6.0%
• Average age	45.4	45.4	0.0
• Average years of credited service	11.5	11.7	-0.2
• Total payroll ¹	\$200,234,161	\$208,175,344	-3.8%
• Average payroll ¹	54,059	53,474	1.1%
• Account balances	118,930,326	130,542,185	-8.9%
• Total active vested participants	2,504	2,674	-6.4%
Inactive vested participants²	378	362	4.4%
Inactive nonvested participants due a refund	246	117	110.3%
Retired participants:			
• Number in pay status	2,313	2,183	6.0%
• Average age	69.8	69.8	0.0
• Average monthly benefit	\$2,669	\$2,596	2.8%
Disabled participants:			
• Number in pay status ³	457	459	-0.4%
• Average age	63.0	62.5	0.5
• Average monthly benefit	\$1,695	\$1,683	0.7%
Beneficiaries:			
• Number in pay status	585	560	4.5%
• Average age	75.6	75.3	0.3
• Average monthly benefit	\$1,049	\$1,042	0.7%

¹The total and average payroll includes \$2,847,692 in salaries for 45 retirees who have returned to active employment with the City as of June 30, 2019 under the provisions of H.B.397. However, these individuals are counted as inactive vested or retired participants elsewhere in this exhibit, depending on whether they are receiving benefits from the Supplemental System or the Retirement and Relief System.

²Includes future pensioners currently receiving benefits from the Supplemental System.

³Includes one disabled participant whose benefit currently paid from the Retirement and Relief System is zero due to worker's compensation benefits in excess of the benefit payable under the System.

Section 3: Supplemental Information

Exhibit B: Participants in Active Service as of June 30, 2019 by Age, Years of Credited Service, and Average Payroll

B-1 All Participants

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	92	90	2	--	--	--	--	--	--	--
	\$39,459	\$39,409	\$41,694	--	--	--	--	--	--	--
25 - 29	306	236	69	--	1	--	--	--	--	--
	42,484	39,923	51,445	--	\$28,642	--	--	--	--	--
30 - 34	424	233	123	67	1	--	--	--	--	--
	47,887	42,380	53,662	\$55,891	84,341	--	--	--	--	--
35 - 39	455	152	117	146	39	1	--	--	--	--
	53,693	43,613	55,784	59,910	63,810	\$38,955	--	--	--	--
40 - 44	466	122	87	124	104	29	--	--	--	--
	54,121	44,251	52,373	55,867	61,938	65,385	--	--	--	--
45 - 49	533	113	87	101	107	99	26	--	--	--
	58,791	47,501	55,699	58,614	64,801	66,455	\$64,972	--	--	--
50 - 54	500	84	67	76	98	99	54	22	--	--
	57,927	47,904	54,864	54,655	57,640	61,553	73,002	\$64,787	--	--
55 - 59	491	75	61	63	77	80	77	56	2	--
	57,514	49,741	54,381	50,360	58,623	60,083	63,393	64,102	\$113,560	--
60 - 64	306	38	38	44	53	42	49	28	13	1
	55,687	46,384	50,128	49,701	57,610	53,560	66,428	54,103	79,708	\$76,862
65 - 69	66	8	13	11	10	9	7	3	1	4
	62,121	56,904	59,113	69,935	60,214	65,723	51,147	51,874	76,862	80,720
70 & over	20	3	3	10	2	--	1	--	--	1
	56,162	50,065	63,053	49,014	73,286	--	80,668	--	--	66,503
Total	3,659	1,154	667	642	492	359	214	109	16	6
	\$53,945	\$43,640	\$54,000	\$56,249	\$60,857	\$61,993	\$66,385	\$61,335	\$83,762	\$77,708

Note: This chart excludes 45 retirees who have been reemployed by the City under the provisions of H.B.397.

Section 3: Supplemental Information

Exhibit B: Participants in Active Service as of June 30, 2019 by Age, Years of Credited Service, and Average Payroll

B-2 General Employees

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	22	21	1	--	--	--	--	--	--	--
	\$31,505	\$31,482	\$31,990	--	--	--	--	--	--	--
25 - 29	119	107	11	--	1	--	--	--	--	--
	33,508	33,237	36,580	--	\$28,642	--	--	--	--	--
30 - 34	197	140	40	17	--	--	--	--	--	--
	40,653	39,996	43,738	\$38,802	--	--	--	--	--	--
35 - 39	200	105	41	43	10	1	--	--	--	--
	45,565	42,096	49,324	50,168	47,435	\$38,955	--	--	--	--
40 - 44	282	104	63	61	40	14	--	--	--	--
	46,614	43,490	49,597	46,979	50,055	44,979	--	--	--	--
45 - 49	328	96	65	64	44	44	15	--	--	--
	52,947	45,378	54,315	54,953	60,503	57,059	\$52,678	--	--	--
50 - 54	364	76	57	61	68	63	23	16	--	--
	52,890	47,154	53,857	52,293	54,131	55,720	59,934	\$52,432	--	--
55 - 59	422	72	56	57	67	63	61	45	1	--
	54,600	49,618	53,691	49,198	57,976	58,173	57,003	55,500	\$133,889	--
60 - 64	266	37	38	39	49	36	35	23	8	1
	52,909	46,494	50,128	47,134	57,014	51,187	62,420	49,248	72,458	\$76,862
65 - 69	65	8	13	10	10	9	7	3	1	4
	62,152	56,904	59,113	70,917	60,214	65,723	51,147	51,874	76,862	80,720
70 & over	20	3	3	10	2	--	1	--	--	1
	56,162	50,065	63,053	49,014	73,286	--	80,668	--	--	66,503
Total	2,285	769	388	362	291	230	142	87	10	6
	\$49,822	\$42,390	\$51,032	\$50,363	\$55,928	\$55,603	\$58,234	\$53,158	\$79,042	\$77,708

Section 3: Supplemental Information

Exhibit B: Participants in Active Service as of June 30, 2019 by Age, Years of Credited Service, and Average Payroll

B-3 Fire

Age	Years of Service								
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39
Under 25	32	31	1	--	--	--	--	--	--
	\$42,190	\$41,893	\$51,397	--	--	--	--	--	--
25 - 29	77	50	27	--	--	--	--	--	--
	49,349	46,542	54,548	--	--	--	--	--	--
30 - 34	91	42	24	24	1	--	--	--	--
	54,132	47,306	56,996	\$61,954	\$84,341	--	--	--	--
35 - 39	117	26	30	43	18	--	--	--	--
	59,924	46,863	57,530	64,031	72,970	--	--	--	--
40 - 44	95	12	10	24	42	7	--	--	--
	67,195	50,392	59,399	65,347	70,295	\$94,879	--	--	--
45 - 49	102	12	11	14	33	26	6	--	--
	69,243	64,437	59,119	63,878	71,249	74,954	\$74,158	--	--
50 - 54	67	5	3	7	14	17	17	4	--
	72,832	54,858	59,835	66,663	67,758	70,429	83,143	\$99,986	--
55 - 59	29	2	1	2	5	6	9	4	--
	79,303	54,569	68,910	62,804	65,750	69,932	92,556	103,694	--
60 - 64	12	--	--	1	1	2	5	2	1
	79,557	--	--	60,109	60,109	76,670	92,179	76,862	\$66,503
Total	622	180	107	115	114	58	37	10	1
	\$62,167	\$47,736	\$57,110	\$63,958	\$70,517	\$75,572	\$85,197	\$96,844	\$66,503

Note: This chart excludes one retired firefighter who has been reemployed by the City under the provisions of H.B.397.

Section 3: Supplemental Information

Exhibit B: Participants in Active Service as of June 30, 2019 by Age, Years of Credited Service, and Average Payroll

B-4 Police

Age	Years of Service								
	Total	0 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 - 34	35 - 39
Under 25	38	38	--	--	--	--	--	--	--
	\$41,764	\$41,764	--	--	--	--	--	--	--
25 - 29	110	79	31	--	--	--	--	--	--
	47,389	44,788	\$54,017	--	--	--	--	--	--
30 - 34	136	51	59	26	--	--	--	--	--
	54,188	44,870	59,033	\$61,469	--	--	--	--	--
35 - 39	138	21	46	60	11	--	--	--	--
	60,190	47,173	60,404	63,939	\$63,705	--	--	--	--
40 - 44	89	6	14	39	22	8	--	--	--
	63,949	45,149	59,848	63,935	67,588	\$75,289	--	--	--
45 - 49	103	5	11	23	30	29	5	--	--
	67,048	47,615	60,456	65,598	64,010	73,089	\$90,831	--	--
50 - 54	69	3	7	8	16	19	14	2	--
	70,024	55,321	60,938	62,156	63,699	72,950	82,158	\$93,231	--
55 - 59	40	1	4	4	5	11	7	7	1
	72,452	48,963	60,403	60,708	60,169	65,648	81,582	96,773	\$93,231
60 - 64	28	1	--	4	3	4	9	3	4
	71,845	42,286	--	72,124	66,518	63,355	67,710	76,154	97,511
65 - 69	1	--	--	1	--	--	--	--	--
	60,109	--	--	60,109	--	--	--	--	--
Total	752	205	172	165	87	71	35	12	5
	\$59,674	\$44,734	\$58,762	\$63,790	\$64,685	\$71,599	\$79,567	\$91,028	\$96,655

Note: This chart excludes 44 retired police officers who have been reemployed by the City under the provisions of H.B.397.

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Exhibit C: Reconciliation of Participant Data

	Active Participants	Inactive Vested Participants	Fire and Police Retirees	Disableds	Retired Participants	Beneficiaries	Total
Number as of July 1, 2018	3,893	66	296	459	2,183	560	7,457
• New participants	294	N/A	0	N/A	N/A	N/A	294
• Terminations – with vested rights	-1	1	0	0	0	0	0
• Terminations – without vested rights	-177	N/A	0	N/A	N/A	N/A	-177
• Retirements	-210	-1	85	N/A	126	N/A	0
• New disabilities	-10	0	0	10	N/A	N/A	0
• Return to work	13	-5	0	0	-1	N/A	7
• Deceased	-3	0	0	-13	-54	-20	-90
• New beneficiaries	0	0	0	0	0	46	46
• Lump sum cash-outs	-135	-6	0	0	0	0	-141
• Rehire	0	0	0	N/A	0	N/A	0
• Certain period expired	N/A	N/A	0	0	0	-1	-1
• Data adjustments	-5	0	0	1	1	0	-3
• Active participants no longer accruing benefits	0	0	0	N/A	N/A	N/A	0
• Retirees transferring from supplemental plan	0	0	-58	0	58	0	0
Number as of July 1, 2019	3,659	55	323	457	2,313	585	7,392

Section 3: Supplemental Information

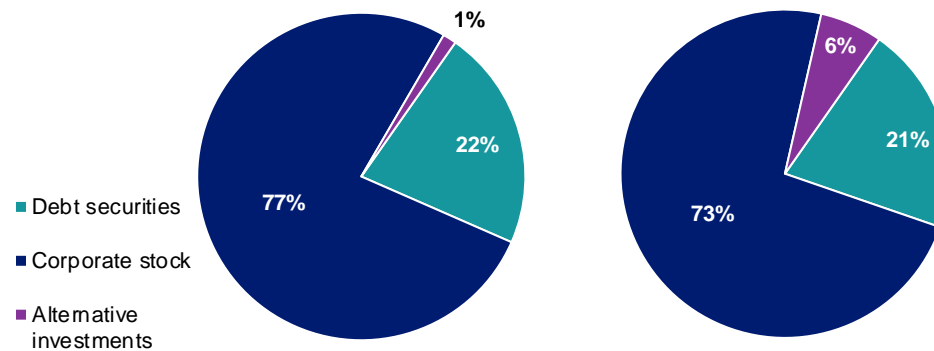
Exhibit D: Summary Statement of Income and Expenses on a Market Value Basis

	Year Ended June 30, 2019	Year Ended June 30, 2018
Net assets at market value at the beginning of the year	\$1,055,421,690	\$1,038,084,945
Contribution income:		
• Employer contributions	\$16,939,246	\$14,724,092
• Employee contributions	13,859,226	14,152,427
• F&P Supplemental contributions	2,713,405	2,551,981
• Less administrative expenses	<u>-280,245</u>	<u>-260,079</u>
<i>Net contribution income</i>	<i>\$33,231,632</i>	<i>\$31,168,421</i>
Investment income:		
• Interest, dividends and other income	\$26,340,660	\$23,339,270
• Asset appreciation	27,214,905	57,010,614
• Less investment fees	<u>-4,565,932</u>	<u>-4,341,069</u>
<i>Net investment income</i>	<i><u>\$48,989,633</u></i>	<i><u>\$76,008,815</u></i>
Total income available for benefits	\$82,221,265	\$107,177,236
Less benefit payments:		
• Benefits	-\$86,698,843	-\$81,639,099
• Refunds	-1,990,308	-2,331,001
• DROP Payments	-6,076,313	-5,871,693
• Pension Reimbursements	<u>0</u>	<u>1,302</u>
<i>Net benefit payments</i>	<i>-\$94,765,464</i>	<i>-\$89,840,491</i>
Change in market value of assets	-\$12,544,199	\$17,336,745
Net assets at market value at the end of the year	\$1,042,877,491	\$1,055,421,690

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Exhibit E: Summary Statement of Plan Assets

	June 30, 2019	June 30, 2018
Cash equivalents	\$74,891,254	\$26,794,273
Total accounts receivable	\$12,816,799	\$12,993,957
Investments:		
• Corporate stock	\$734,286,632	\$744,865,408
• Debt securities	208,908,193	209,050,244
• Alternative investments	<u>12,800,872</u>	<u>62,638,277</u>
Total investments at market value	\$955,995,697	\$1,016,553,929
Total assets	\$1,043,703,750	\$1,056,342,159
Total accounts payable	-826,259	-920,469
Net assets at market value	\$1,042,877,491	\$1,055,421,690
Net assets at actuarial value	\$1,063,878,399	\$1,066,035,625



Section 3: Supplemental Information

Exhibit F: Development of the Fund through June 30, 2019

Year Ended June 30	Employer Contributions	Employee Contributions	Other Contributions	Net Investment Return ¹	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
2010	\$13,224,808	\$11,896,839	\$17,000	\$86,792,989	\$263,250	\$59,444,574	\$811,198,139	\$913,077,824	112.6%
2011	13,772,490	11,881,396	8,000	142,064,641	273,817	79,179,627	899,471,222	892,096,375	99.2%
2012	13,676,554	12,027,821	12,000	29,540,542	145,619	67,679,529	886,902,991	878,048,507	99.0%
2013	13,591,846	11,786,408	888,918	91,188,014	138,933	69,109,986	935,111,258	888,209,730	95.0%
2014	14,039,103	11,984,752	-888,918 ²	144,761,454	122,916	72,124,342	1,032,760,391	945,245,264	91.5%
2015	14,464,552	12,227,545	0	43,686,697	178,807	76,439,094	1,026,521,284	993,856,763	96.8%
2016	13,837,061	13,843,088	2,533,039 ³	4,081,529	266,304	78,753,617	981,796,080	1,016,437,956	103.5%
2017	14,040,165	14,030,922	2,514,643	109,852,441	284,778	83,864,528	1,038,084,945	1,044,789,100	100.6%
2018	14,724,092	14,152,427	2,551,981	76,008,815	260,079	89,840,491	1,055,421,690	1,066,035,625	101.0%
2019	16,939,246	13,859,226	2,713,405	48,989,633	280,245	94,765,464	1,042,877,491	1,063,878,399	102.0%

¹On a market basis, net of investment fees

²As of June 30, 2013, there was a contribution balance of \$888,918 for active fire and police employees with more than 30 years of service, which was understood to be a pending transfer from the Supplemental System. Segal adjusted the market value of assets to account for this pending transfer. This adjustment was reversed as of June 30, 2014, as the transfer was within the Supplemental System accounts, and not to the Retirement and Relief System.

³Prior to 2016, contributions received from the Fire and Police Supplemental Plan on behalf of retired police officers and firefighters were included with employer contributions; they are now shown as other income.

Section 3: Supplemental Information

Exhibit G: Section 415 Limitations

Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan.

A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active participants could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets.

In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of \$160,000 indexed for inflation. That limit is \$225,000 for 2019. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each participant's circumstances, for such things as form of benefits chosen and after tax contributions.

Benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).

Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard.

Section 3: Supplemental Information

Exhibit H: Definition 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):	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: 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.

Section 3: Supplemental Information

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.

Section 3: Supplemental Information

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.

Section 3: Supplemental Information

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.

Actuarial Valuation Basis

Exhibit I: Actuarial Assumptions and Actuarial Cost Method

Rationale for Assumptions:	The information and analysis used in selecting each demographic assumption that has a significant effect on this actuarial valuation is shown in the Experience Study Report for the five-year period ended June 30, 2015. Based on the results of that study as well as professional judgment, no additional demographic assumption changes are warranted at this time and will be assessed again in the next five-year review.			
Net Investment Return:	7.50% The net investment return assumption was chosen by the Retirement and Relief System's Board of Trustees, with input from the actuary. The net 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 System's target asset allocation.			
Salary Increases:	<u>General</u>		<u>Fire and Police</u>	
	Age	Rate (%)	Years of Service	Rate (%)
	20	7.00	Less than 1	6.75
	25	6.25	1-2	6.50
	30	5.50	2-3	6.25
	35	4.75	3-4	6.00
	40	4.00	4-5	5.75
	45	3.50	5-6	5.50
	50	3.00	6-7	5.25
	55	2.75	7-8	5.00
	60 & over	2.50	8-9	4.75
			9-10	4.50
			10-15	4.00
			15-20	3.50
			20-25	3.00
			25-29	2.75
	<i>Note: The salary increase rates for all groups include 2.50% inflation.</i>			

Section 4: Actuarial Valuation Basis

Payroll Growth:	2.50%, used to amortize the unfunded actuarial accrued liability as a level percentage of payroll.				
Administrative Expenses:	<p>\$275,000 per year, payable monthly, equivalent to \$264,493 at the beginning of the year.</p> <p>The annual administrative expenses were based on historical and current data and adjusted to reflect estimated future experience and professional judgment.</p>				
Mortality Rates:					
<i>Pre-retirement:</i>	RP-2014 Blue Collar Employee Mortality Table, set forward two years for males and four years for females, projected generationally using Scale MP-2015				
<i>Healthy annuitants:</i>	RP-2014 Blue Collar Healthy Annuitant Mortality Table, set forward two years for males and four years for females, projected generationally using Scale MP-2015				
<i>Disabled annuitants:</i>	RP-2014 Disabled Retiree Mortality Table, projected generationally using Scale MP-2015				
	The tables above, with adjustments as shown, reasonably reflect the mortality experience of the System as of the measurement date. The mortality tables were then generationally projected using Scale MP-2015 to reflect future mortality improvement.				
Annuitant Mortality Rates:	Rate (%)				
		Healthy¹		Disabled¹	
	Age	Male	Female	Male	Female
	55	0.69	0.53	2.34	1.45
	60	0.98	0.80	2.66	1.70
	65	1.50	1.27	3.17	2.09
	70	2.37	2.08	4.03	2.82
	75	3.83	3.44	5.43	4.10
	80	6.36	5.83	7.66	6.10
	85	10.70	10.04	11.33	9.04
	90	17.77	16.63	17.30	13.27
	¹ Rates shown do not include generational projection.				

Section 4: Actuarial Valuation Basis

Mortality and Disability Rates Before Retirement:

Age	Rate (%)				
	Mortality ¹		Disability		
	Male	Female	General	Fire	Police
20	0.06	0.02	0.40	0.15	0.15
25	0.06	0.02	0.40	0.15	0.15
30	0.06	0.03	0.40	0.15	0.15
35	0.07	0.04	0.40	0.95	0.15
40	0.09	0.07	0.40	0.95	0.50
45	0.16	0.11	0.40	0.95	0.50
50	0.27	0.17	0.95	0.95	0.50
55	0.44	0.25	0.95	0.95	0.50
60	0.76	0.38	0.95	0.95	0.50

¹Rates shown do not include generational projection.

On the Job Disability:

General	50%
Fire	80%
Police	100%

On the Job Death:

General	5%
Fire and Police	15%

Section 4: Actuarial Valuation Basis

Termination Rates Before Retirement:

Years of Service	Rate (%)	
	Withdrawal	
	General	Fire and Police
1	10.00	5.00
2	9.00	4.50
3	8.00	4.25
4	7.50	4.00
5	7.00	3.75
6	6.50	3.50
7	6.00	3.25
8	5.50	3.00
9	5.00	2.50
10	4.50	2.00
11	4.00	1.75
12	3.50	1.50
13	3.00	1.25
14	2.50	1.00
15	2.00	1.00
16	1.50	1.00
17-20	1.00	0.50
20-30	1.00	0.00

Section 4: Actuarial Valuation Basis

Retirement Rates:

Fire		Police	
Years of Service ¹	Rate (%)	Years of Service ¹	Rate (%)
20	15.0	20	30.0
21	10.0	21	15.0
22-25	5.0	22	7.5
26-27	20.0	23-25	2.5
28	10.0	26	20.0
29	50.0	27-28	10.0
30-32	0.0	29	40.0
33	50.0	30-32	0.0
34	20.0	33	100.0
35	100.0		

¹Retirement is assumed to occur no later than age 65

Note: Benefits are payable from the F&P Supplemental Pension System until the participant reaches 30 years of service under the R&R System.

General Employees Hired Prior to July 1, 2017		General Employees Hired On or after July 1, 2017	
Age	Rate (%)	Age	Rate (%)
Under 50	0.0	Under 50	0.0
50-54	35.0	50-54	35.0
55-60	20.0	55-60	20.0
61	25.0	61	25.0
62	40.0	62	50.0
63-64	25.0	63-64	25.0
65	35.0	65	60.0
66-73	35.0	66-73	35.0
74 & over	100.0	74 & over	100.0

Section 4: Actuarial Valuation Basis

Description of Weighted Retirement Age	Age 59.6, 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, 2019 actuarial valuation.
Retirement Rates for Inactive Vested Participants:	60
Interest on DROP Accounts:	5.00%
Utilization of BackDROP:	<p>40% of retiring General Employees are assumed to elect a three-year BackDROP. General Employees who retire prior to 33 years of service are not assumed to utilize the BackDROP provisions of the plan.</p> <p>90% of retiring Firefighters are assumed to elect a three-year BackDROP. Firefighters who retire prior to 23 years of service are not assumed to utilize the BackDROP provisions of the plan.</p> <p>70% of retiring Police Officers are assumed to elect a three-year BackDROP. Police Officers who retire prior to 23 years of service are not assumed to utilize the BackDROP provisions of the plan.</p>
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:	75%
Age of Spouse:	Females three years younger than males
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 the age at the time the participant commenced employment. Normal Cost and Actuarial Accrued Liability are calculated on an individual basis, with Normal Cost determined as if the current benefit accrual rate had always been in effect. Actuarial Liability is allocated by salary.
Justification for Change in Actuarial Assumptions:	Based on past experience and future expectations, the administrative expense assumption was increased from \$260,000 to \$275,000.

Section 4: Actuarial Valuation Basis

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.

Plan Year:	July 1 through June 30
Plan Status:	Ongoing
Normal Retirement:	
<u>Members whose participation began before July 1, 2017</u>	
<i>Eligibility</i>	A participant may retire at (a) age 60 if he has completed 5 years of credited service, or (b) any age if he has completed 30 years of credited service.
<i>Amount</i>	2.50% of final average salary for each year of credited service. This amount cannot be greater than 75.0% of the final average salary nor less than \$400 per month.
<u>Members whose participation began on or after July 1, 2017</u>	
<i>Eligibility</i>	A participant may retire at (a) age 62 if he has completed 10 years of credited service, or (b) any age if he has completed 30 years of credited service.
<i>Amount</i>	2.25% of final average salary for each year of credited service. This amount cannot be greater than 67.5% of the final average salary nor less than \$400 per month.
	Service credit used to determine the benefit amount may be increased by credit granted for unused sick leave (on a percent of possible total basis).
	Final average salary is defined as the highest average compensation over any 36-month period of the employee's last ten years of participation.
Early Retirement:	
<i>Eligibility</i>	A City participant may retire at age 55 if he has completed 25 years of credited service.
<i>Amount</i>	1.85% of final average salary for each year of credited service.
Ordinary Disability:	
<i>Service Requirement</i>	5 years of credited service.
<i>Amount</i>	2.00% of final average salary at disability for each year of credited service, payable immediately. This amount cannot be greater than 60% of final average salary nor less than \$400.

Section 4: Actuarial Valuation Basis

Extraordinary Disability:	None			
<i>Service Requirement</i>	70% of final monthly salary at disability offset by the maximum Worker's Compensation benefit, payable immediately			
<i>Amount</i>				
Vesting Period:	5 years of credited service for participants hired prior to July 1, 2017 10 years of credited service for participants hired on or after July 1, 2017			
Termination:	To a participant terminating before becoming eligible for a vested deferred pension from the plan, a lump sum of his or her own contributions without interest is payable. Participants terminating after achieving vested status who leave their contributions in the System have a non-forfeitable right to a monthly pension beginning at age 60. The form and amount of the pension are the same as the normal pension.			
Death Benefits:	If a participant dies prior to his or her attainment of eligibility for retirement, a lump sum of his or her own contributions without interest is payable to his or her beneficiary. If an active participant who is eligible to retire or a retired participant dies, 60% of the accrued pension benefit is payable to the surviving spouse, if any, during his or her remaining lifetime. If an active participant (other than a participant of the Firemen and Policemen Supplemental System) who is not eligible to retire, but who is vested dies, a portion of 60% of the accrued pension benefit is payable to the spouse during her remaining lifetime. This portion is defined as follows:			
	Hired Prior to July 1, 2017		Hired On or After July 1, 2017	
	Number of Years of Service	Portion of Entitled Benefit	Number of Years of Service	Portion of Entitled Benefit
	5	50%	10	50%
	6	60	11	60
	7	70	12	70
	8	80	13	80
	9	90	14	90
	10 or more	100	15 or more	100
	This benefit is payable at the earlier of (a) the date that the deceased participant would have attained age 60 or (b) the date the deceased participant would have completed 20 years of service. In lieu of the above, for all participants, an annuity of 60% of salary is payable to the surviving spouse and 10% is payable to a minor child if death is service connected; the maximum for spouse and children is 75% and the maximum for children if no spouse is 60%. The minimum spouse benefit is \$320 per month.			

Section 4: Actuarial Valuation Basis

BackDROP:	An employee with 33 years of service or who is at least age 63 with 23 years of service may elect up to a 36-month BackDROP. The employee's monthly benefit will be calculated using service and final average salary as of the BackDROP date and the employee will receive a lump sum equal to the number of months dropped back times the retirement benefit, accumulated with interest.
Participation:	All qualified employees of the Retirement and Relief System are required to participate.
Contribution Rates: <i>Employees</i> <i>City</i>	7.00% of compensation 8.50% of compensation effective July 1, 2018 12.00% of compensation effective July 1, 2019
Changes in Plan Provisions:	There have been no changes in plan provisions since the last valuation.

9116005v1/02030.001

Data Section

StringBookmarks

PlanNameLong City of Birmingham Retirement and Relief System

PlanNameShort System

OfficeAddr1 710 North 20th Street, GA 100 City Hall

OfficeAddr2 Birmingham, Alabama 35203-2216

ClientContact Board of Managers

FinanSource City's Finance Department

ActuaryName Deborah K. Brigham

ActuaryTitle Senior Vice President and Actuary

ActuaryCredential FCA, ASA, MAAA, EA

ActuaryNumber 99-1234

Assumptions Board of Managers

ConsultantName Leon F. (Rocky) Joyner, Jr., FCA, ASA, MAAA, EA

ConsultantTitle Senior Vice President and National Public Sector Retirement Practice Leader

SegalAddr1 2727 Paces Ferry Road SE, Building One, Suite 1400

SegalAddr2 Atlanta, GA 30339-4053

SegalPhone 678.306.3100

SegalFax 678.669.1887

ParticipantName Participant

ParticipantPlural Participants

RetireeName Retired participant

RetireePlural Retired participants

AuditorCompany

FMWording Entry Age Normal

ValDate"7/1/2019"

ValDateEOY "6/30/2020"

FiscalDate "7/1/2019"

FiscalDateEOY "6/30/2019"

CensusDate "7/1/2019"

CensusDateEOY "6/30/2019"

ValDate1 "7/1/2018"

ValDateEOY1 "6/30/2019"
ValDateMinusOne "6/30/2019"
ValDate1MinusOne "6/30/2018"
FiscalDate1 "7/1/2018"
CreditRef Years of Credited Service
CreditRefSingle Year of Credited Service
PayRef Payroll
PayRefSingle Payroll
GLText loss
GLAdminText loss
OtherGLText gain
GLInvText loss
HistYearsText ten
EmpName Employer
OptCategory1 Fire and Police Retirees
OptCategory2 Disableds
OptRow Retirees transferring from supplemental plan
InactNonText
ContribRef Actuarially determined
ClientRef State
ClientRef County

Florida	0	"#"
FundingMethod	2	"#"
AssetMethod	6	"#"
IntVal	0.0750	"#.00%"
IntActual	0.0574	"#.00%"
IntActual1	0.0787	"#.00%"
MVIntActual	0.0478	"#.00%"
MVIntActual1	0.0753	"#.00%"
DollarLimit	225,000	"#,###"
DollarLimit1	220,000	"#,###"
Valcycle	1	"#"
Fiscal	0	"#"
ActNumTot	3,659	"#,###"
ActNumTot1	3,893	"#,###"
ActNumUnknown	0	"#,###"
AveSalary	54,724	"#,###"
AveSalary1	53,474	"#,###"
ActAge	45.4	"#,###"
ActAge1	45.4	"#,###"
ActSvc	11.5	"#,###"
ActSvc1	11.7	"##.##"
Payroll	200,234,161	"#,###"
Payroll1	208,175,344	"#,###"
BenNum	585	"#,###"
BenNum1	560	"#,###"
BenBft	613,618	"#,###"
BenBft1	583,762	"#,###"
RDNum	2,769	"#,###"
RDNum1	2,642	"#,###"
SuspendedPens	1	"#,###"
SuspendedPens1	0	"#,###"
RDBft	6,940,831	"#,###"
RDBft1	6,440,296	"#,###"
InactNum	378	"#,###"
InactNVNum	246	
TotalCount	7,391	"#,###"
TotalCount1	7,457	"##.##"
AstMkt	1,042,877,491	"#,###"
AstAct	1,063,878,399	"#,###.##"

AstAct1	1,066,035 ,625	"#,###"
InvGL	- 18,268,54 7	"#,###"
AstActAve	1,035,268 ,709	"#,###"
UpCorridor	1.2000	"#.00%"
LowCorridor	0.8000	"#.00%"
CorridorAdjust	0	"#,###"
CalcUal	437,503,0 97	"#,###"
OtherGL	1,944,362	"#,###"
ExpGL	-20,932	"#,###"
TotalGI	- 16,345,11 7	"#,###"
AdminExp	1	"#"
ActAL	1,501,381 ,496	"#,###"
ActAL1	1,470,251 ,127	"#,###"
ActOPExpDol	280,245	"#,###"
AsmExpDolPer	264,493	"#,###"
AsmExpDolPer1	250,066	"#,###"
SchAmtYrs	29	"#,###"
FCRate	0.1606	"#.00%"
FCRate1	0.1496	"#.00%"
RecCont	32,166,23 0	"#,###"
RecContInc	33,501,80 6	"#,###"
RecContPct	0.1606	"#.00%"
RecContPctInc	0.1673	"#.00%"
ProjCont1	44,529,13 6	"#,###"

ActCont	33,511,877	"#,###"
ContGL	-13,204,973	"#,###"
AvgRetBft	2,252	"#,###"
AvgRetBft1	2,194	"#,###"
AvgRetAge	69.9	"#,###"
AvgRetAge1	69.5	"#,###"
AVR	5.2	"#,###"
AVR1	5.1	"#,###"
LVR	7.5	"#,###"
LVR1	7.1	"#,###"

HighMVARate	0.1806	"#,###"
LowMVARate	-0.1109	
YearsMVARate	20.0000	
ThreePctChangeCost	3,423,688.8409	
LastYrContrib	16,939,246.0000	
DeltaContrib	-13,017,616.0711	
PctDeltaContrib	-0.4345	
ChngContrib	912,066.0892	
ChngContribPct	0.0046	
ActAmort	9,999.9900	
AmortPolicy	29.0000	
OnePctChangeCost	1,141,229.6136	
OnePctChangeCostPayroll	0.0057	
InvestGLMax	43,484,694.0000	
InvestGLMin	-33,034,851.0000	
OtherGLMax	14,066,195.0000	

OtherGLMin	- 23,002,95 3.0000	
MVNoLoss	926,899,4 10.5520	
FundPctMax	0.8201	
FundPctMin	0.7086	
FundPctYearSince	2,010.000 0	
PartRatioMax	1.0200	
PartRatioMin	0.6843	
PartRatioCurrent	1.0200	
PartRatioPrior	0.9155	
RetiredRatioAAL	0.5677	"#,###"
IVRatioAAL	0.0848	"#,###"
NetNewMoney	- 39,759,10 4.0000	"#,###"
NetNewMoneyPctMVA	-0.0381	"#,###"
NetNewMoneyRatioTen Years	2.3751	"#,###"
NetNewMoneyRatioCurr ent	2.8362	"#.00%"
BftExpContrib	61,533,83 2.0000	"#,###"

	First
Chart1First	2010
Chart6First	2010
Chart8First	2010
Chart11First	2000
Chart12First	2000
Chart18First	2011
Chart21First	2010

	Last
Chart1Last	2019
Chart6Last	2019
Chart8Last	2019

Chart11Last	2019
Chart12Last	2019
Chart18Last	2020
Chart21Last	2019

	Num
Chart1Num	10
Chart6Num	10
Chart8Num	10
Chart11Num	20
Chart12Num	20
Chart18Num	10
Chart21Num	10

GASBStringBookmarks
 PlanNameLongGASB Plan's Full Name
 PlanNameShortGASB Plan's Short Name
 ClientShortGASB Client_GASB
 FundOfficeContactGASB Fund Office Contact
 OfficeAddr1GASB Fund Office Address
 OfficeAddr2GASB Anywhere USA 99999
 ActuaryNameGASB Actuary1
 ActuaryTitleGASB Title
 ActuaryCredentialsGASB FSA, MAAA, EA
 AnalystGASB ABC
 ReviewerGASB XYZ
 ConsultantNameGASB ConsultName
 ConsultantTitleGASB ConsultTitle
 SegalOfficeGASB New York
 ValDateGASB "12/31/2017"
 ValDateGASB1 "12/31/2016"
 MeasureDate "12/31/2017"
 MeasureDate1 "12/31/2016"

IntDisc	7.00%	"#.00%"
IntDisc1	7.00%	"#.00%"
InflRate	3.50%	"#.00%"
SalRate	4.50%	"#.00%"
ColaRate	3.00%	"#.00%"

Results of last import: Last Import was Successful!
 Type of import: Import Itemized!
 Spreadsheet imported from: M:\BIRMCY.CLI\Plans\RR\val2019\RRVal2019-v80FINAL.xlsm
 Date and time of import: 05/20/2020 3:19:47 PM

Exhibit : Section 415

Section 415 of the Internal Revenue Code (IRC) specifies the maximum benefits that may be paid to an individual from a defined benefit plan and the maximum amounts that may be allocated each year to an individual's account in a defined contribution plan.

A qualified pension plan may not pay benefits in excess of the Section 415 limits. The ultimate penalty for non-compliance is disqualification: active participants could be taxed on their vested benefits and the IRS may seek to tax the income earned on the plan's assets.

In particular, Section 415(b) of the IRC limits the maximum annual benefit payable at the Normal Retirement Age to a dollar limit of \$160,000 indexed for inflation. That limit is \$225,000 for 2019. Normal Retirement Age for these purposes is age 62. These are the limits in simplified terms. They must be adjusted based on each participant's circumstances, for such things as [age at retirement,] form of benefits chosen and after tax contributions.

Benefits in excess of the limits may be paid through a qualified governmental excess plan that meets the requirements of Section 415(m).

Legal Counsel's review and interpretation of the law and regulations should be sought on any questions in this regard.

Exhibit : Supplementary State of Florida Information Summary of Salary Changes

Year Ended June 30	Total Salary	Percent Change in Total Salary	Percent Change in Salary of Employees Remaining Active	Expected Percent Change in Salary of Employees Remaining Active

Note: The average total payroll growth for the most recent ten years was x.xx% per year.

Exhibit : Supplementary State of Florida Information Recent History of Recommended and Actual Contributions

Plan Year Ended	Valuation Year	State Contribution	Enhancements			Recommended Contribution				Actual City Contribution
			State Increase	Amount Made	Amount Available	Base Amount	Allowable Offset	Total	City	

Exhibit : Supplementary State of Florida Information Recent History of Recommended and Actual Contributions (continued)

Fiscal Year Ended June 30	Valuation Date June 30	Contribution Rate as Percent of Valuation Payroll	Valuation Payroll	Recommended Contribution	Actual Contribution

Exhibit : Supplementary State of Florida Information Comparative Summary of Principal Valuation Results

	Year Ended June 30, 2019			
	New Plan New Assumptions	Old Plan New Assumptions	Old Plan Old Assumptions	Year Ended June 30, 2018
Participant data				
• Active members	3,659	3,659	3,659	3,893
• Total annual payroll	\$200,234,161	\$200,234,161	\$200,234,161	\$208,175,344
• Retired members and beneficiaries (including x window participants)	3,355	3,355	3,355	3,202
• Total annualized benefit	\$90,746,424	\$90,746,424	\$90,746,424	\$84,288,696
• Terminated vested members	378	378	378	362
• Total annualized benefit	\$14,999,040	\$14,999,040	\$14,999,040	\$13,840,368
• DROP participants				
• Total current balance				
Actuarial value of assets	\$1,063,878,399	\$1,063,878,399	\$1,063,878,399	\$1,066,035,625
Present value of all future expected benefit payments:				
• Active members:				
• Retirement benefits				
• Vesting benefits				
• Disability benefits				
• Death benefits				
• Return of contributions				
• Total	--	--	--	--
• Terminated vested members	127,363,017	127,363,017	127,363,017	119,202,067
• Retired members and beneficiaries	852,396,077	852,396,077	852,396,077	791,271,345
• DROP participants				
Total	\$979,759,094	\$979,759,094	\$979,759,094	\$910,473,412

Exhibit : Supplementary State of Florida Information Comparative Summary of Principal Valuation Results

	Year Ended June 30, 2019			Year Ended June 30, 2018
	New Plan New Assumptions	Old Plan New Assumptions	Old Plan Old Assumptions	
Unfunded actuarial accrued liability	\$437,503,097	\$437,503,097	\$437,503,097	\$404,215,502
Actuarial present value of accrued benefits				
Vested accrued benefits				
Active members	\$314,233,979	\$314,233,979	\$314,233,979	\$342,021,091
Inactive members	127,363,017	127,363,017	127,363,017	119,202,067
Pensioners and beneficiaries	852,396,077	852,396,077	852,396,077	791,271,345
DROP participants				
Nonvested active members	<u>123,192,184</u>	<u>123,192,184</u>	<u>123,192,184</u>	<u>128,466,381</u>
Total	\$1,417,185,257	\$1,417,185,257	\$1,417,185,257	\$1,380,960,884
Pension cost				
Normal cost, including administrative expenses	\$18,193,198	\$18,178,771	\$18,178,771	\$19,804,803
Expected employee contributions	-14,016,391	-14,016,391	-14,016,391	-14,572,274
Level % of payroll payment to amortize unfunded actuarial accrued liability	26,760,410	26,760,410	27,178,122	24,724,333
Total minimum annual cost payable monthly at valuation date	32,166,230	32,151,230	32,585,537	31,146,931
Estimated State contributions				
Total employer cost projected to budget year				
Payroll	200,234,161	200,234,161	200,234,161	208,175,344
As % of payroll	16.06%	16.06%	16.27%	14.96%
Present value of active members' future salaries at attained age	\$1,575,560,932	\$1,575,560,932	\$1,575,560,932	\$1,646,648,258

Exhibit : Supplementary State of Florida Information Actuarial Present Value of Accumulated Plan Benefits

Factors	Change in Actuarial Present Value of Accumulated Plan Benefits
	\$1,380,960,884
Benefits accumulated, net experience gain or loss, changes in data	\$30,971,476
Benefits paid	-94,765,464
Interest	100,018,361
Changes in assumptions	--
Plan changes	--
Net increase	\$36,224,373
As % of payroll	18.09%
Actuarial present value of accumulated benefits as of July 1, 2019	\$1,417,185,257

Exhibit : Supplementary State of Florida Information Reconciliation of DROP Accounts

Attained Age	Total Actives	Eligible for Normal	Number Retiring	Number Entering DROP

Determination of Actuarial Value of Assets

1	Market value of assets, June 30, 2019		\$1,042,877,491
2	Calculation of unrecognized return	Original Amount *	Unrecognized Amount**
(a)	Year ended June 30, 2019	-\$27,859,475	-\$22,287,580
(b)	Year ended June 30, 2018	352,647	211,587
(c)	Year ended June 30, 2017	38,226,369	15,290,548
(d)	Year ended June 30, 2016	-71,077,315	-14,215,463
(e)	Year ended June 30, 2015	-27,004,744	0
(f)	Year ended June 30, 2014	0	0
(g)	Year ended June 30, 2013	0	0
(h)	Year ended June 30, 2012	0	0
(i)	Year ended June 30, 2011	0	0
(j)	Year ended June 30, 2010	0	0
(k)	Total unrecognized return		-21,000,908
3	Preliminary actuarial value: (1) - (2k)		\$1,063,878,399
4	Adjustment to be within 20% corridor		0
5	Final actuarial value of assets as of June 30, 2019: (3) + (4)		<u>1,063,878,399</u>
6	Actuarial value as a percentage of market value: (5) ÷ (1)		102.0%
7	Amount deferred for future recognition***: (1) - (5)		-\$21,000,908

*Total return minus expected return on a market value basis

**Recognition at 20% per year over five years

***Deferred return as of June 30, 2019 recognized in each of the next 5 years:

(a) Amount recognized on June 30, 2020	-\$12,071,555	(f) Amount recognized on June 30, 2025	--
(b) Amount recognized on June 30, 2021	2,143,908	(g) Amount recognized on June 30, 2026	0
(c) Amount recognized on June 30, 2022	-5,501,366	(h) Amount recognized on June 30, 2027	0
(d) Amount recognized on June 30, 2023	-5,571,895	(i) Amount recognized on June 30, 2028	0
(e) Amount recognized on June 30, 2024	0	(j) Amount recognized on June 30, 2029	0

	2009	2008	2007	2012	2011
Total pension liability					
• Service cost	\$0	\$0	\$0	\$0	\$0
• Interest	0	0	0	0	0
• Change of benefit terms	0	0	0	0	0
• Differences between expected and actual experience	0	0	0	0	0
• Changes of assumptions	0	0	0	0	0
• Benefit payments, including refunds of employee contributions	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Net change in total pension liability	\$0	\$0	\$0	\$0	\$0
Total pension liability – beginning	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Total pension liability – ending (a)	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Plan fiduciary net position					
• Contributions – employer	\$0	\$0	\$0	\$0	\$0
• Contributions – employee	0	0	0	0	0
• Net investment income	0	0	0	0	0
• Benefit payments, including refunds of employee contributions	0	0	0	0	0
• Administrative expense	0	0	0	0	0
• Other	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Net change in plan fiduciary net position	\$0	\$0	\$0	\$0	\$0
Plan fiduciary net position – beginning	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>	<u>0</u>
Plan fiduciary net position – ending (b)	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Net pension liability – ending (a) – (b)	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>	<u>\$0</u>
Plan fiduciary net position as a percentage of the total pension liability	0.00%	0.00%	0.00%	0.00%	0.00%
Covered employee payroll	\$0	\$0	\$0	\$0	\$0
Net pension liability as percentage of covered employee payroll	0.00%	0.00%	0.00%	0.00%	0.00%

Notes to Schedule:

Benefit changes: Include any commentary.

Change of Assumptions: Include any commentary.