

City of St. Clair Shores Police and Fire Retirement System

70th Annual Actuarial Valuation Report
June 30, 2019



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November 15, 2019

Retirement Board
City of St. Clair Shores Police and
Fire Retirement System
27600 Jefferson Circle Drive
St. Clair Shores, Michigan 48081-9971

**Re: City of St. Clair Shores Police and Fire Retirement System Valuation as of June 30, 2019
Actuarial Disclosures**

Dear Board Members:

The results of the June 30, 2019 Annual Actuarial Valuation of the City of St. Clair Shores Police and Fire Retirement System, which is based upon Act 345 of the Public Acts of 1937, as amended, are presented in this report.

This report was prepared at the request of the Board and is intended for use by the Retirement System and those designated or approved by the Board. This report may be provided to parties other than the System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

The purposes of the valuation are to measure the System's funding progress as of June 30, 2019, and to determine the employer contribution rate for the fiscal year ending June 30, 2021. This report should not be relied on for any purpose other than the purposes described herein. Determinations of financial results, associated with the benefits described in this report, for purposes other than those identified above may be significantly different.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Section C of this report. This report includes risk metrics shown in Appendix 3, but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment.

This valuation assumed the continuing ability of the plan sponsor to make the contributions necessary to fund this plan. A determination regarding whether or not the plan sponsor is actually able to do so is outside our scope of expertise and was not performed.

The findings in this report are based on data and other information through June 30, 2019. The valuation was based upon information furnished by the Plan Administrator, concerning Retirement System benefits, financial transactions, plan provisions and active members, terminated members, retirees and beneficiaries. We checked for internal reasonability and year-to-year consistency, but did not audit the data. We are not responsible for the accuracy or completeness of the information provided by the Plan Administrator.

This report was prepared using assumptions adopted by the Board and first used in the June 30, 2016 actuarial valuation. All actuarial assumptions used in this report are reasonable for the purposes of this valuation. Additional information about the actuarial assumptions is included in the section of this report entitled Valuation Methods and Assumptions.

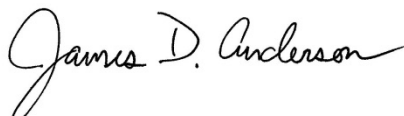
This report has been prepared by actuaries who have substantial experience valuing public employee retirement systems. To the best of our knowledge, the information contained in this report is accurate and fairly presents the actuarial position of the City of St. Clair Shores Police and Fire Retirement System as of the valuation date. All calculations have been made in conformity with generally accepted actuarial principles and practices and the Actuarial Standards of Practice issued by the Actuarial Standards Board.

James D. Anderson and Mark Buis are Members of the American Academy of Actuaries. These actuaries meet the Academy's Qualification Standards to render the actuarial opinions contained herein.

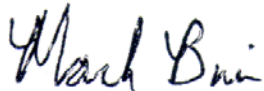
The signing actuaries are independent of the plan sponsor.

Gabriel, Roeder, Smith & Company will be pleased to review this valuation report with the Board of Trustees and to answer any questions pertaining to the valuation.

Respectfully submitted,



James D. Anderson, FSA, EA, FCA, MAAA



Mark Buis, FSA, EA, FCA, MAAA

JDA/MB:sc



SECTION A

VALUATION RESULTS

Funding Objective

The funding objective of the Retirement System is to establish and receive contributions, expressed as percents of active member payroll, which will remain approximately level from year-to-year and will not have to be increased for future generations of citizens.

Contribution Rates

The Retirement System is supported by member contributions, City's contributions and investment income from Retirement System assets.

Contributions which satisfy the funding objective are determined by the annual actuarial valuation and are sufficient to:

- (1) cover the actuarial costs allocated to the current year by the actuarial cost methods described in Section C (the normal cost); and
- (2) finance over a period of future years the actuarial cost not covered by present assets and anticipated future normal costs (unfunded actuarial accrued liability).

Contribution requirements for the fiscal year beginning July 1, 2020 are shown on page A-2.

The Board of Trustees of the City of St. Clair Shores Police and Fire Retirement System confirms that the System provides for payment of the required employer contribution as described in Section 20m of Michigan Public Act No. 728.

City's Computed Contributions

Valuation Date June 30 Contributions for Fiscal Year Beginning July 1	Contributions Expressed as Percents of Annual Pay	
	2019	2018
	2020	2019
NORMAL COST		
Age and service pensions	17.38%	17.61%
Death before retirement pensions	0.34%	0.35%
Disability pensions	0.86%	0.86%
Total	18.58%	18.82%
MEMBERS' CONTRIBUTIONS		
Gross contributions*	4.50%	4.50%
Less prospective refunds	0.27%	0.27%
Available for pensions	4.23%	4.23%
CITY'S NORMAL COST	14.35%	14.59%
AMORTIZATION UNFUNDED ACTUARIAL ACCRUED LIABILITIES (UAAL) [#]	43.13%	36.69%
TOTAL CITY CONTRIBUTIONS [@] - %	57.48%	51.28%
- \$	\$6,555,275	\$6,305,270

* *Weighted average.*

Unfunded actuarial accrued liabilities were amortized as a level percent of payroll over a period of 21 years for the fiscal year beginning July 1, 2019. For the fiscal year beginning July 1, 2020, a portion of the UAAL was amortized over a period of 4 years and the remaining UAAL was amortized over a period of 20 years.

@ *All fiscal year 2020 calculations are based on the valuation payroll of \$10,646,171 for the period July 1, 2018 - June 30, 2019, assumed to increase at a rate of 3.5% each year. No adjustments have been made to reflect agreements which may limit pay increases over the next year. To the extent that actual pays are less (greater) than projected, application of the rate shown will produce dollar contributions less than (greater than) the amount illustrated above. Any shortfall (excess) will manifest as an increase (decrease) in future contribution rates.*

Overall contribution rates, as a percent of payroll, increased from last year. This was primarily due to lower projected payroll, as contributions are financed over non-DROP payroll. On a dollar basis, the contribution increased slightly more than expected primarily due to unfavorable investment performance.

Determination of Unfunded Actuarial Accrued Liability

	June 30,	
	2019	2018
A. Accrued Liability		
1. For retirees and beneficiaries	\$ 130,071,321	\$ 117,135,664
2. For vested terminated members	580,023	892,969
3. For present active members		
a. Value of expected future benefit payments	60,250,195	69,860,391
b. Value of future normal costs	18,268,875	18,531,534
c. Active member accrued liability: (a) - (b)	41,981,320	51,328,857
4. Total accrued liability	172,632,664	169,357,490
B. Present Assets (Funding Value)	106,337,490	106,133,099
C. Unfunded Accrued Liability: (A.4) - (B)	66,295,174	63,224,391
D. Funding Ratio: (B) / (A.4)	61.6%	62.7%
E. Funding Ratio: Market Value Basis	61.3%	62.3%

Reconciliation of DROP Accounts as Provided by System

Year Ended June 30	Balance at Beginning of Year	Credits	Interest	Distributions	Adjustments	Balance at End of Year
2018	\$ -	\$ 77,986	\$ -	\$ -	\$ -	\$ 77,986
2019	77,986	469,351	-	(106,232)	-	441,105

Development of Funding Value of Assets

Year Ended June 30:	2018	2019	2020	2021	2022	2023
A. Funding Value Beginning of Year	\$ 102,698,691	\$ 106,133,099				
B. Market Value End of Year	105,480,848	105,768,802				
C. Market Value Beginning of Year	102,735,561	105,480,848				
D. Non-Investment Net Cash Flow	(4,991,587)	(6,166,222)				
E. Investment Income						
E1. Market Total: B - C - D	7,736,874	6,454,176				
E2. Assumed Rate of Investment Return	7.50%	7.50%				
E3. Amount for Immediate Recognition	7,515,217	7,728,749				
E4. Amount for Phased-In Recognition: E1-E3	221,657	(1,274,573)				
F. Phased-In Recognition of Investment Income						
F1. Current Year: 0.20 x E4	44,331	(254,915)				
F2. First Prior Year	756,064	44,331	\$ (254,915)			
F3. Second Prior Year	(1,194,157)	756,064	44,331	\$ (254,915)		
F4. Third Prior Year	(709,460)	(1,194,157)	756,064	44,331	\$ (254,915)	
F5. Fourth Prior Year	2,014,000	(709,459)	(1,194,155)	756,066	44,333	\$(254,913)
F6. Total Recognized Investment Gain(Loss)	910,778	(1,358,136)	(648,675)	545,482	(210,582)	(254,913)
G. Funding Value End of Year: A + D + E3 + F5	106,133,099	106,337,490				
H. Difference between Market & Funding Value	(652,251)	(568,688)				
I. Recognized Rate of Return - Funding Value	8.41%	6.18%				
J. Recognized Rate of Return - Market Value	7.72%	6.30%				

The Funding Value of Assets recognizes assumed investment income (line E3) fully each year. Differences between actual and assumed investment income (line E4) are phased-in over a closed five-year period. During periods when investment performance exceeds the assumed rate, Funding Value of Assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, Funding Value of Assets will tend to be greater than market value. The Funding Value of Assets is unbiased with respect to Market Value. At any time, it may be either greater or less than Market Value. If actual and assumed rates of investment income are exactly equal for four consecutive years, the Funding Value will become equal to Market Value.

Derivation of Experience Gain (Loss)

Actual experience will never (except by coincidence) coincide exactly with assumed experience. It is hoped that gains and losses will cancel each other over a period of years, but sizable year-to-year fluctuations are common. Detail on the derivation of the experience gain (loss) is shown below, along with a year-by-year comparative schedule.

(1) UAAL* at start of year	\$ 63,224,391
(2) Total normal cost	2,267,886
(3) Actual contributions for pensions	6,411,775
(4) Interest accrual	4,586,433
(5) Expected UAAL* before changes	63,666,935
(6) Change from amendments	0
(7) Change in asset smoothing methodology	0
(8) Change from assumption and actuarial cost method revisions	0
(9) Expected UAAL* after changes	63,666,935
(10) Actual UAAL*	66,295,174
(11) Gain (loss) (9) - (10)	(2,628,239)
(12) Gain (loss) as percent of actuarial accrued liabilities at start of year (\$169,357,490)	(1.6)%

* *Unfunded actuarial accrued liabilities.*

Valuation Date	Experience Gain (Loss) as % of Beginning Accrued Liability
6-30-10	(1.0) %
6-30-11	(6.4)
6-30-12	(8.0)
6-30-13	(4.4)
6-30-14	0.7
6-30-15	0.6
6-30-16	(1.2)
6-30-17	0.2
6-30-18	(1.1)
6-30-19	(1.6)

Comparative Schedule and Risk Measures

Fiscal Year Ended 6/30	Valuation Year Ended 6/30	Valuation Payroll	Actuarial Accrued		Accrued Assets			Unfunded Actuarial Accrued Liabilities & Reserves			City's Contrib. Rate	Computed Contribution Based on Proj. Valuation Payroll	Contribution Based on Actual Payroll
			Liabilities (AAL) & Reserves	AAL as % of Payroll	Accrued Assets	as % of Payroll	% Funded	Dollars	Amortiz. Period	% of Payroll			
1997	1995	\$ 6,970,235	\$ 61,692,487	8.9 %	\$ 66,621,054	9.6 %	108.0 %	\$ (4,928,567)	21 yrs.	- %	15.71 *		
1998	1996	7,115,881	66,563,082	9.4	71,692,536	10.1	107.7	(5,129,454)	20	-	16.51 #		
1999	1997	7,715,637	69,290,760	9.0	79,687,515	10.3	115.0	(10,396,755)	19	-	12.61		
2000	1998	8,088,601	74,132,345	9.2	91,138,639	11.3	122.9	(17,006,294)	10	-	0 **		
2001	1999	8,426,850	77,538,939	9.2	101,745,561	12.1	131.2	(24,206,622)	10	-	0.00 #		
2002	2000	9,169,906	81,816,157	8.9	110,243,719	12.0	134.7	(28,427,562)	10	-	0.00 #		
2003	2001	9,353,854	86,607,994	9.3	113,344,804	12.1	130.9	(26,736,810)	10	-	0.00 #		
2004	2002	9,566,435	90,182,317	9.4	108,832,118	11.4	120.7	(18,649,801)	10	-	0.00 #		
2005	2003	9,387,845	93,967,332	10.0	101,683,192	10.8	108.2	(7,715,860)	10	-	8.73 #		
2006	2004	9,687,275	98,335,479	10.2	94,640,250	9.8	96.2	3,695,229	25	38	20.45 *		
2007	2005	10,307,055	104,248,328	10.1	90,853,624	8.8	87.2	13,394,704	25	130	25.88 *		
2008	2006	10,675,665	107,602,157	10.1	93,730,948	8.8	87.1	13,871,209	25	130	25.84		
2009	2007	10,684,097	111,001,598	10.4	99,906,347	9.4	90.0	11,095,251	25	104	24.30 #		
2010	2008	10,802,446	117,284,024	10.9	105,559,450	9.8	90.0	11,724,574	25	109	24.90 #	\$ 2,873,399	\$ 2,894,223
2011	2009	11,507,841	125,940,115	10.9	103,972,349	9.0	82.6	21,967,766	30	191	29.52 *	3,628,981	3,452,136
2012	2010	10,654,588	129,441,265	12.1	102,981,697	9.7	79.6	26,459,568	29	248	30.57 #	3,479,418	3,134,333 **
2013	2011	11,313,370	139,365,119	12.3	101,229,663	8.9	72.6	38,135,456	28	337	31.73 #	3,834,745	3,199,458
2014	2012	9,660,548	145,517,428	15.1	94,147,081	9.7	64.7	51,370,347	27	532	42.81	4,417,956	4,478,945
2015	2013	9,955,027	148,187,126	14.9	88,557,717	8.9	59.8	59,629,409	26	599	47.25	5,024,799	4,958,089
2016	2014	10,066,742	152,788,010	15.2	92,913,702	9.2	60.8	59,874,308	25	595	47.76	5,136,032	5,378,316
2017	2015	10,636,062	155,713,847	14.6	96,946,709	9.1	62.3	58,767,138	24	553	48.24 **	5,603,001	5,519,497
2018	2016	10,961,050	160,273,313	14.6	98,726,449	9.0	61.6	61,546,864	23	562	49.28	5,898,688	5,721,505
2019	2017	10,958,170	163,548,117	14.9	102,698,691	9.4	62.8	60,849,426	22	555	50.79 *	5,962,068	5,875,818
2020	2018	11,478,231	169,357,490	14.8	106,133,099	9.2	62.7	63,224,391	21, 5	551	51.28 #	6,305,270	-
2021	2019	10,646,171	172,632,664	16.2	106,337,490	10.0	61.6	66,295,174	20, 4	623	57.48	6,555,275	-

* Revised actuarial assumptions and/or methods.

Retirement System amended.

** Includes Funding Reserve transfer of \$1,081,261 (formerly included in FY 2010).

The ratio of Valuation Assets to Actuarial Accrued Liabilities is a traditional measure of a system's funding progress. Except in years when the system is amended or actuarial assumptions are revised, this ratio can be expected to increase gradually toward 100%.

The Ratio of Unfunded Actuarial Accrued Liabilities to Valuation Payroll is another relative index of condition. Actuarial unfunded liabilities represent debt, while active member payroll represents the system's capacity to collect contributions to pay toward debt. The lower the ratio, the greater the financial strength and vice versa.

Comments

ACTUARIAL EXPERIENCE

The Actuarially determined employer contribution increased from \$6,305,270 to last year to \$6,555,275% of pay this year. This was primarily attributable to unfavorable investment performance.

PLAN AMENDMENTS

There were no changes to plan provisions since the previous valuation.

ACTUARIAL METHODS AND ASSUMPTIONS

There were no changes to actuarial methods and assumptions since the previous valuation.

PUBLIC ACT 202

Under Public Act 202 of the State of Michigan, Michigan municipalities will be required to report liabilities under new uniform assumption guidelines. While the current guidelines are currently only for reporting purposes (and not funding), City governments will be encouraged to use these new assumptions for funding.

The uniform assumptions include the following:

- Investment return no higher than 7.0%;
- Assumed wage inflation no lower than 3.5%;
- Mortality assumption that uses a version of the RP-2014 table (with possible update to PUB-2010, developed for the public sector); and
- Amortization period no longer than 20 years for Pension Plans and 30 years for Retiree Health Plans.
- The information needed to satisfy PA 202 reporting requirements was supplied in the GASB report.

LOOKING AHEAD: The 7.5% assumed rate of return is at the upper end of our reasonable range of return assumptions. We recommend that consideration be given to lowering this assumption to 7.25% effective with the June 30, 2020 valuation.

CERTIFICATION: To the best of our knowledge and belief, the valuation is complete and accurate and was made in accordance with generally recognized actuarial methods. The actuarial assumptions summarized in Section C are in the aggregate a reasonable representation of the past and anticipated future experience of the System.

Other Observations

General Implications of Contribution Allocation Procedure or Funding Policy on Future Expected Plan Contributions and Funded Status

Given the plan's contribution allocation procedure, if all actuarial assumptions are met (including the assumption of the plan earning 7.5% on the actuarial value of assets), it is expected that:

- 1) Employer normal cost amounts as a percentage of payroll will remain approximately level year-to-year;
- 2) The unfunded actuarial accrued liability will be fully amortized after 20 years; and
- 3) The funded status of the plan will increase gradually towards a 100% funded ratio.

Comments (Concluded)

Limitations of Funded Status Measurements

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. Unless otherwise indicated, with regards to any funded status measurements presented in this report:

- 1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.
- 2) The measurement is inappropriate for assessing the need for or the amount of future employer contributions.
- 3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.
- 4) The funding level of the plan on a Market Value basis is shown on page A-3.

SECTION B

VALUATION DATA

Brief Summary of Act 345 Benefit Provisions (June 30, 2019)

SERVICE RETIREMENT

The benefit amounts attributable to regular retirements and the conditions under which such benefits may be paid are described in tabular form on page B-3.

DEFERRED RETIREMENT

Eligibility - 10 or more years of service, payable to member or eligible surviving spouse.

Annual Amount - Computed as service retirement but based upon service, FAC and benefit in effect at termination. Benefit begins at date retirement would have occurred had member remained in employment. Benefit to eligible surviving spouse actuarially reduced in accordance with an Option I election.

DEATH AFTER RETIREMENT SURVIVOR'S PENSION

Eligibility - Payable to a surviving spouse, if any, upon the death of a retired member who is receiving a regular straight life pension.

Annual Amount - Spouse's pension equals 60% of the regular straight life pension the deceased retiree was receiving.

NON-DUTY DEATH-IN-SERVICE SURVIVOR'S PENSIONS

Eligibility - Payable to a surviving spouse, if any, upon the death of a member with 10 or more years of service.

Annual Amount - Accrued straight life pension actuarially reduced in accordance with an Option I election.

DUTY DEATH-IN-SERVICE SURVIVOR'S PENSIONS

Eligibility - Payable upon the expiration of worker's compensation to the survivors of a member who died in the line of duty.

Annual Amount - Same amount that was paid by worker's compensation.

NON-DUTY DISABILITY

Eligibility - Payable upon the total and permanent disability of a member with 5 or more years of service.

Annual Amount - To age 55: 1.5% of FAC times years of service. At age 55: Computed like Service Retirement Pension.

DUTY DISABILITY

Eligibility - Payable upon the total and permanent disability of a member in the line of duty.

Annual Amount - To Age 55: 50% of FAC. At Age 55: Computed like Service Retirement Pension with service credit from date of disability to age 55.

Brief Summary of Act 345 Benefit Provisions – (Continued)

DROP PROGRAM

Effective Date: Sixty (60) days after ratification of the 2017-2020 City of St. Clair Shores Command Officers Association collective bargaining agreement (including Police AR4 members), through June 30, 2020.

Eligibility: Any age with 25 years of service.

Maximum DROP Participation Period: 3 years.

DROP Benefit: Regular monthly benefit frozen at date of DROP election.

DROP Account:

- **Amount credited:** 100% of the DROP Benefit.
- **Interest credit rate:** 0% per annum.

COLA: DROP election date is considered retirement for purposes of determining the date of the first post-retirement increase.

Annuity Withdrawal: Available only at the time of election to participate in DROP (DROP date).

Member Contributions: Cease upon DROP date.

Distribution of DROP Funds: One or a combination of the following distribution methods.

- A total lump sum distribution;
- A partial lump sum distribution; or
- A lump sum direct rollover to another qualified plan.

DROP Program Evaluation: Continuation of the DROP program past the June 30, 2020 election date is scheduled to be evaluated on or before November 15, 2019.

DROP Payroll: Payroll for members electing DROP will not be considered for purposes of employer contributions.

Brief Summary of Act 345 Benefit Provisions (Concluded)

Group	Eligibility				Benefit Formula				FAC Years (Final Average Compensation)	Maximum Benefit (% of FAC)	Base Wages	Member Contribution Rate ⁵	Annuity Withdrawal	DROP ⁶	
	Age	Service	Age	Service	Multiplier x Service	Multiplier x Service	Multiplier x Service	Multiplier x Service							
Fire AR4	60	10	or	- 25	2.80%	first 25	+	1.00%	over 25	3 out of last 10	70% ¹	No	5.00%	w/o Reduction	
Fire Hired Before 1/1/2010	60	10	or	- 25	2.80%	first 25	+	1.00%	over 25	3 out of last 10	70%	No	4.50%	w/o Reduction ²	
Fire Hired After 1/1/2010	50	25	or	60 10	2.25%	first 25	+	1.00%	over 25	3 out of last 10	70%	No	4.50%	with Reduction ²	
Fire Hired After 1/1/2016	50	25	or	60 10	2.25%	first 25	+	1.00%	over 25	3 out of last 10	70%	Yes	4.50%	No	
Police AR4	60	10	or	- 25	2.80%	first 25	+	1.00%	over 25	3 out of last 10	70% ¹	No	4.50%	w/o Reduction ⁴	Yes
Police Command Hired Before 4/22/2011	60	10	or	- 25	2.80%	first 25	+	1.00%	over 25	3 out of last 10	75%	No	4.50%	w/o Reduction ⁴	Yes
Police Command Hired After 4/22/2011	60	10	or	- 25	2.25%	first 25	+	1.00%	over 25	3 out of last 10	70%	No	4.50%	with Reduction ⁴	Yes
Police Command Hired After 8/17/2015	60	10	or	- 25	2.25%	first 25	+	1.00%	26 - 30	3 out of last 10	-	Yes	4.50%	No	Yes
Police Hired Before 1/1/2011	60	10	or	- 25	2.80%	first 25	+	1.00%	over 25	3 out of last 10	75%	No	4.50%	w/o Reduction ³	
Police Hired After 1/1/2011	60	10	or	- 25	2.25%	first 25	+	1.00%	over 25	3 out of last 10	70%	No	4.50%	with Reduction ³	
Police Hired After 8/17/2015	60	10	or	- 25	2.25%	first 25	+	1.00%	26 - 30	3 out of last 10	-	Yes	4.50%	No	

- 1 Additionally, the formula benefit is capped at the annual base pay amount received by the employee at the time of separation from the City.
- 2 Contributions made after 7/1/2015 are non-refundable.
- 3 Contributions made after 8/17/2015 are non-refundable.
- 4 Contributions made after 3/1/2018 are non-refundable.
- 5 Member contributions cease upon entry into DROP.
- 6 Participation election during select periods of time for those with 25 or more years of service.

POST-RETIREMENT INCREASE (Compounded)

Group	Effective Date	First Increase		Second Increase		Third Increase		Fourth Increase		Fifth Increase		Sixth Increase	
		Earliest Date After Retirement	Percent	Years After First	Percent	Years After Second	Percent	Years After Third	Percent	Years After Fourth	Percent	Years After Fifth	Percent
Fire	07/01/94	Age 60 or 5 yrs	5.0%	5	5.0%								
Fire	07/01/00	Age 60 or 5 yrs	5.0%	5	5.0%	5	5.0%						
Fire	07/01/08	Age 60 or 3 yrs	2.5%	2	2.5%	2	2.5%	3	2.5%	2	2.5%	3	2.5%
Fire AR4	07/01/94	Age 60 or 5 yrs	5.0%	5	5.0%								
Fire AR4	07/01/00	Age 60 or 3 yrs	2.5%	2	5.0%	2	2.5%	3	5.0%				
Fire AR4	03/19/07	Age 60 or 3 yrs	2.5%	2	2.5%	2	2.5%	3	2.5%	2	2.5%	3	2.5%
Police	07/01/95	Age 60 or 5 yrs	5.0%	5	5.0%								
Police	07/01/01	Age 60 or 5 yrs	5.0%	5	5.0%	5	5.0%						
Police	04/07/08	Age 60 or 3 yrs	2.5%	2	2.5%	2	2.5%	3	2.5%	2	2.5%	3	2.5%
Police AR4	07/01/96	Age 60 or 5 yrs	5.0%	5	5.0%								
Police AR4	07/01/00	Age 60 or 3 yrs	2.5%	2	5.0%	2	2.5%	3	5.0%				
Police AR4	03/19/07	Age 60 or 3 yrs	2.5%	2	2.5%	2	2.5%	3	2.5%	2	2.5%	3	2.5%
Police Command	07/01/96	Age 60 or 5 yrs	5.0%	5	5.0%								
Police Command	07/01/00	Age 60 or 3 yrs	2.5%	2	5.0%	2	2.5%	3	5.0%				
Police Command	03/19/07	Age 60 or 3 yrs	2.5%	2	2.5%	2	2.5%	3	2.5%	2	2.5%	3	2.5%

Summary of Asset Information Furnished for Valuation

Balance Sheet as of JUNE 30, 2019

Current Assets		Reserves for	
Cash & Equivalents	\$ 3,281,992	Employees' Contributions	\$ 4,874,420
Receivables & Accruals	124,516	Employer Contributions	8,831,991
Bonds	21,496,440	Retired Benefit Payments	90,984,636
Common Stocks	61,295,123	Excess Earnings Reserve	1,077,755
Other Equities (ADR & Closed End)	0		
Foreign Stocks	19,762,546		
Stock Mutual	0		
Real Estate	0		
Sovereign Securities	0		
Other Assets (Securities lending)	0		
Amount due to Broker	(191,815)		
Total Current Assets	105,768,802	Total Reserves	105,768,802
Market Adjustment*	568,688	Market Adjustment*	568,688
Total Valuation Assets	\$ 106,337,490	Total Valuation Assets	\$ 106,337,490

* See page A-4 for derivation of the market adjustment.

Revenues and Expenditures

Balance July 1, 2018	\$ 106,133,099
Revenues	
Employees' Contributions	535,957
Employer Contributions	5,875,818
Medicare Reimbursement#	306,096
Recognized Net Investment Income for Valuation Purposes	6,370,613
Expenditures	
Benefit Payments	12,577,997
Medicare Payments#	306,096
Refund of Member Contributions	0
Balance June 30, 2019	\$ 106,337,490

Medicare payments to retirees are paid monthly by the custodian from Retirement System assets. At the end of each quarter, these amounts are reimbursed to the System by the City.

Retirants and Beneficiaries Added to and Removed from Rolls Comparative Statement

Year Ended	Added		Removed		End of Year		Present Value of Pensions	No. Active Per Retired	Pensions as a % of Pay	
	No.	Annual Pensions*	No.	Annual Pensions	Annual Pensions					
					No.	Dollars				Average
06/30/95	12	\$ 310,528	6	\$ 72,195	137	\$ 3,538,351	\$25,827	\$ 38,275,321	0.9	50.8 %
06/30/96	5	218,810	2	60,982	140	3,696,179	26,401	41,070,046	0.9	51.9
06/30/97	8	263,580	3	39,650	145	3,908,161	26,953	42,664,623	0.9	50.7
06/30/98	3	113,305	4	57,891	144	3,963,575	27,525	43,132,825	0.9	49.0
06/30/99	5	184,089	3	73,575	146	4,074,089	27,905	43,562,686	0.9	48.3
06/30/00	8	210,945	6	63,777	148	4,221,257	28,522	45,621,123	1.0	46.0
06/30/01	11	561,909	1	31,905	158	4,751,261	30,071	51,576,330	0.9	50.8
06/30/02	7	382,191	1	25,921	164	5,107,531	31,143	55,538,402	0.9	53.4
06/30/03	11	542,341	6	125,964	169	5,523,908	32,686	60,372,325	0.8	58.8
06/30/04	5	270,095	4	62,801	170	5,731,202	33,713	62,257,626	0.8	59.2
06/30/05	3	208,628	4	74,027	169	5,865,803	34,709	63,269,802	0.8	56.9
06/30/06	1	159,216	1	23,281	169	6,001,738	35,513	63,705,139	0.8	56.2
06/30/07	9	457,887	4	173,043	174	6,286,582	36,130	66,195,952	0.8	58.8
06/30/08	11	541,013	10	205,207	175	6,622,388	37,842	70,074,164	0.7	61.3
06/30/09	2	70,988	2	62,270	175	6,631,106	37,892	69,744,638	0.8	57.6
06/30/10	14	903,334	8	194,140	181	7,340,300	40,554	74,174,079	0.7	68.9
06/30/11	3	189,988	2	54,426	182	7,475,862	41,076	76,305,408	0.7	66.1
06/30/12	23	1,587,008	5	59,572	200	9,003,298	45,016	97,569,177	0.6	93.2
06/30/13	8	370,387	6	171,451	202	9,202,234	45,556	98,403,589	0.6	92.4
06/30/14	9	613,570	6	145,681	205	9,670,123	47,171	103,931,310	0.6	96.1
06/30/15	2	112,315	4	54,849	203	9,727,589	47,919	105,988,711	0.6	91.5
06/30/16	7	375,154	6	169,577	204	9,933,166	48,692	108,000,994	0.6	90.6
06/30/17	11	763,618	5	196,366	210	10,500,418	50,002	113,755,625	0.6	95.8
06/30/18	9	461,753	3	87,336	216	10,874,835	50,346	117,135,664	0.6	94.7
06/30/19	9	573,329	5	104,739	220	11,343,425	51,561	130,071,321	0.6	106.5

* Includes cost-of-living increases for ongoing retirees.

Retirants and Beneficiaries JUNE 30, 2019 Tabulated by Type of Pensions Being Paid

Type of Pensions Being Paid	No.	Annual Pensions
Age and Service Pensions		
Regular pensions - benefit terminating at death of retirant	44	\$ 2,152,320
Regular pension - automatic benefit to spouse of deceased retirant	117	7,948,986
Option I pension - joint and survivor benefit	2	60,515
Survivor beneficiary of deceased retirant	35	688,245
Other - benefit being paid to an ex-spouse	<u>14</u>	<u>270,285</u>
Total Age and Service Pensions	212	11,120,351
Casualty Pensions		
Duty disability	3	58,371
Non-Duty Disability	1	26,113
Non-Duty death pension to widow	<u>4</u>	<u>108,590</u>
Total Casualty Pensions	8	193,074
Total Pensions Being Paid	220	\$11,313,425

Retirants and Beneficiaries JUNE 30, 2019 Tabulated by Attained Age

Attained Age	Retirants		Beneficiaries		Other *		Totals	
	No.	Annual Pensions	No.	Annual Pensions	No.	Annual Pensions	No.	Annual Pensions
45 - 49	5	\$ 332,956	1	\$ 46,048	1	\$18,755	7	\$ 397,759
50 - 54	19	1,426,139	1	38,636	1	39,907	21	1,504,682
55 - 59	28	2,163,717			4	110,712	32	2,274,429
60 - 64	20	1,749,616	1	37,139			21	1,786,755
65 - 69	23	1,570,472	3	58,115	2	49,206	28	1,677,793
70 - 74	24	1,227,949	3	112,155	3	19,349	30	1,359,453
75 - 79	26	1,159,147	10	185,389	3	32,356	39	1,376,892
80 - 84	13	388,037	12	200,217			25	588,254
85 - 89	7	205,117	6	94,851			13	299,968
90 - 94	1	17,816	2	24,285			3	42,101
95 - 99	1	35,339					1	35,339
Totals	167	\$10,276,305	39	\$796,835	14	\$270,285	220	\$11,343,425

* Other - Benefits being paid to an ex-spouse.

Comparative Schedules Active Members in Valuation

Year Ended	Active Members	Valuation Payroll	Average			
			Pay	% Incr.	Age	Service
06/30/95	126	\$ 6,970,235	\$ 55,319	13.5 %	38.0 yrs.	12.1 yrs
06/30/96	132	7,115,881	53,908	(2.6)	37.6	11.6
06/30/97	135	7,715,637	57,153	6.0	37.8	11.3
06/30/98	135	8,088,601	59,916	4.8	38.4	11.9
06/30/99	138	8,426,850	61,064	1.9	38.5	12.0
06/30/00	141	9,169,906	65,035	6.5	38.8	12.1
06/30/01	139	9,353,854	67,294	3.5	38.4	11.5
06/30/02	143	9,566,435	66,898	(0.6)	37.8	11.0
06/30/03	133	9,387,845	70,585	5.5	38.2	11.4
06/30/04	130	9,687,275	74,518	5.6	38.9	12.1
06/30/05	129	10,307,055	79,900	7.2	39.4	12.7
06/30/06	134	10,675,665	79,669	(0.3)	39.7	13.0
06/30/07	134	10,684,097	79,732	0.1	40.0	13.5
06/30/08	127	10,802,446	85,059	6.7	40.5	14.1
06/30/09	134	11,507,841	85,879	1.0	40.7	14.4
06/30/10	128	10,654,588	83,239	(3.1)	40.2	14.1
06/30/11	130	11,313,370	87,026	4.5	40.5	14.5
06/30/12	129	9,660,548	74,888	(13.9)	38.1	12.3
06/30/13	130	9,955,027	76,577	2.3	38.4	12.5
06/30/14	128	10,066,742	78,646	2.7	38.2	12.4
06/30/15	130	10,636,062	81,816	4.0	38.8	13.0
06/30/16	130	10,961,050	84,316	3.1	38.7	13.4
06/30/17	128	10,958,170	85,611	1.5	38.5	13.0
06/30/18	132	11,478,231	86,956	1.6	38.1	12.6
06/30/19	123	10,646,171	86,554	(0.5)	37.5	12.0

Active Members Added to and Removed from Rolls

Year Ended	Number Added During Year		Terminations During Year										Active Members End of Year
	A	E	Normal Retirement		Disability Retirement		Died-in-Service		Withdrawal				
			A*	E	A	E	A	E	Vested	Other	Total		
06/30/15	4	2	0	1.1	0	0.3	0	0.1	1	1	2	2.4	130
06/30/16	5	5	4	1.8	0	0.3	0	0.1	1	0	1	2.4	130
06/30/17	7	9	8	3.2	0	0.2	0	0.1	0	1	1	2.2	128
06/30/18	10	6	5	3.3	1	0.2	0	0.1	0	0	0	2.4	132
06/30/19	5	14	13	5.1	0	0.2	0	0.1	0	1	1	2.6	123

A represents actual number.

E represents expected number.

* Includes members entering DROP.

Active Members JUNE 30, 2019 by Age and Years of Service

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	Valuation Payroll
20-24	1							1	\$ 44,650
25-29	18	2						20	1,114,914
30-34	5	21	4					30	2,455,003
35-39		9	13					22	1,964,960
40-44		2	2	17	4			25	2,402,002
45-49	1		2	2	11	1		17	1,777,839
50-54				1	5		1	7	751,142
55-59					1			1	135,661
Totals	25	34	21	20	21	1	1	123	\$10,646,171

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 37.5 years
Service: 12.0 years
Annual Pay: \$86,554

DROP Members JUNE 30, 2019 by Age and Years of Service

Attained Age	Years of Service to Valuation Date							Totals	
	0-4	5-9	10-14	15-19	20-24	25-29	30 Plus	No.	DROP Balance
45-49						3		3	\$ 77,139
50-54						3		3	248,252
55-59						1		1	115,714
Totals						7		7	\$ 441,105

While not used in the financial computations, the following group averages are computed and shown because of their general interest.

Age: 50.7 years
Service: 26.0 years

Inactive Vested Members JUNE 30, 2019 Tabulated by Attained Age

Attained Age	No.	Estimated Deferred Annual Pensions
47	1	\$ 47,998
Totals	1	\$ 47,998

Average Age Now: 47.96 years

SECTION C

VALUATION METHODS AND ASSUMPTIONS

Actuarial Cost Method

Normal cost and the allocation of benefit values between service rendered before and after the valuation date were determined using an individual entry-age normal cost method having the following characteristics:

- The annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the portion of the member's benefit at the time of retirement, death or disability.
- Each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.

Unfunded actuarial accrued liabilities were amortized by level (principal and interest combined) percent-of-payroll contributions in accordance with Section III. C. of the Actuarial Funding Policy. Refer to Appendix II for additional detail. This unfunded actuarial accrued liability payment reflects any payments expected to be made between the valuation date and the date contributions determined by this report are scheduled to begin.

The valuation assets used for funding purposes is derived as follows: prior year valuation assets are increased by contribution and expected investment income and reduced by refunds, benefit payments and expenses. To this amount is added 20% of the difference between expected and actual investment income for each of the previous five years. During periods when investment performance exceeds the assumed rate, actuarial value of assets will tend to be less than market value. During periods when investment performance is less than the assumed rate, actuarial value of assets will tend to be greater than market value.

Excess Earnings Reserve. An amount equal to the market value of the Excess Earnings Reserve is added to the liabilities to assure proper allocation of assets to liabilities.

Actuarial Assumptions Used for the Valuation

The contribution requirements and benefit values of the System are calculated by applying actuarial assumptions to the benefit provisions and people information furnished, using the actuarial cost method described on the previous page.

The principal areas of financial risk which require assumptions about future experiences are:

- Long-term rates of investment return to be generated by the assets of the System;
- Patterns of pay increases to members;
- Rates of mortality among members, retirants and beneficiaries;
- Rates of withdrawal of active members (without entitlement to a retirement benefit);
- Rates of disability among members; and
- The age patterns of actual retirements.

The monetary effect of each assumption is calculated for as long as a present covered person survives – a period of time which can be as long as a century.

Actual experience of the System will not coincide exactly with assumed experience. Each valuation provides a complete recalculation of assumed future experience and takes into account all past differences between assumed and actual experience. The result is a continual series of adjustments (usually small) to the computed contribution rate.

From time-to-time it becomes appropriate to modify one or more of the assumptions, to reflect experience trends (but not random year-to-year fluctuations).

The actuarial assumptions are based upon experience studies dated September 18, 2008 and July 20, 2015.

Valuation Assumptions

The **rate of investment return** is compounded annually net of expenses.

Investment Return	7.50%
Wage Inflation	3.50%
Price Inflation	2.60%
Spread Between Investment Return and Wage Inflation	4.00%
Spread Between Investment Return and Price Inflation	4.90%

These assumptions are used to equate the value of payments due at different points in time.

Economic experience during the last five years has been as follows:

	Year Ending					5-Year Average
	6/30/19	6/30/18	6/30/17	6/30/16	6/30/15	
1) Nominal rate of return#	6.2%	8.4%	9.1%	6.5%	9.5%	7.9%
2) Increase in CPI	1.6	2.9	1.6	1.0	0.1	1.4
3) Average salary increase*	5.6	7.6	6.1	6.6	6.0	6.4
4) Real return:						
- investment purposes	4.6	5.5	7.5	5.5	9.4	6.5
- funding purposes	0.6	0.8	3.0	(0.1)	3.5	1.5
- assumption	4.0	4.0	4.0	3.0	3.0	3.6

The nominal rate of return was computed using the approximate formula: $i = I$ divided by $1/2 (A+B-I)$, where I is realized investment income net of expenses, A is the beginning of year asset value and B is the end of year asset value.

* Based on members who were active both at the beginning and end of the year.

The rates of salary increase used for individual members are in accordance with the following table. This assumption is used to project a member's current salary to the salaries upon which benefit amounts will be based.

Sample Ages	Percent Increase in Salary	
	During Next Year	
	Base	Promotion & Seniority
20	3.5 %	3.0 %
25	3.5	3.0
30	3.5	2.6
35	3.5	1.1
40	3.5	0.2
45	3.5	0.2
50	3.5	0.2
55	3.5	0.1
60	3.5	0.0

If the number of active members remains constant, then the total active member payroll will increase 3.5% annually, the base portion of the individual salary increase assumptions. The base salary increase assumption of 3.5% was first used for the June 30, 2017 valuation.

Valuation Assumptions (Continued)

The mortality rates utilized are based upon the RP-2014 tables, as extended, and include a margin for future mortality improvements projected using a fully generational improvement scale. The tables used were as follows:

Post-Retirement Mortality: The RP-2014 Healthy Annuitant Generational Mortality Tables, with blue collar adjustments and extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 with future mortality improvements assumed each year using scale MP-2015.

Pre-Retirement Mortality: RP-2014 Employee Generational Mortality Tables, with blue collar adjustments and extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 with future mortality improvements assumed each year using scale MP-2015.

Post-Retirement Disabled Mortality: The RP-2014 Disabled Mortality Tables, extended via cubic spline. This table is adjusted backwards to 2006 with the MP-2014 scale. A base year of 2006 with future mortality improvements assumed each year using scale MP-2015.

These tables were first used for the June 30, 2015 valuation. Sample values for Post-Retirement Mortality follow:

Sample Ages	Single Life Retirement Values			
	Present Value of		Future Life	
	\$1 Monthly for Life*		Expectancy (Years)*	
	Men	Women	Men	Women
45	\$149.59	\$152.67	39.27	42.33
50	144.07	148.05	34.24	37.24
55	137.11	142.16	29.40	32.30
60	128.59	134.72	24.81	27.54
65	118.05	125.16	20.46	22.95
70	105.35	113.17	16.39	18.59
75	90.67	98.90	12.69	14.57
80	74.77	82.97	9.47	11.01

* Based on retirements in 2019. Retirements in future years will reflect improvements in life expectancy.

This assumption is used to measure the probabilities of members dying before retirement and the probabilities of each benefit payment being made after retirement. For purposes of the valuation, we assume that 75% of deaths in service are duty related and 25% of deaths in service are non-duty related.

Valuation Assumptions (Continued)

The rates of retirement used to measure the probabilities of eligible members retiring during the next year were as follows:

Retirement Ages	<u>All Others</u>	<u>Fire Hired After 1/1/2010</u>
	Percent of Active Members Retiring within Next Year	Percent of Active Members Retiring within Next Year
45	30 %	
46	30	
47	30	
48	30	
49	30	
50	30	50 %
51	30	30
52	40	40
53	40	40
54	40	40
55	40	40
56	50	50
57	50	50
58	50	50
59	50	50
60	100	100

A member is eligible for retirement after 25 or more years of service, or after attaining age 60 with 10 years of service. Fire members hired after 1/1/2010 are eligible for retirement after attaining age 50 with 25 years of service, or after attaining age 60 with 10 years of service.

It was assumed that 100% of members covered by DROP would enter the DROP upon reaching retirement eligibility. DROP participants are assumed to participate in the DROP for the maximum number of years possible.

Valuation Assumptions (Concluded)

Rates of separation from active membership were as shown below (rates do not apply to members eligible to retire and do not include separation on account of death or disability). This assumption measures the probabilities of members remaining in employment.

Sample Ages	Years of Service	% of Active Members Separating within Next Year
ALL	0	10.00 %
	1	7.00
	2	5.00
	3	4.00
	4	3.50
25	5 & Over	3.50
30		2.90
35		1.50
40		0.60
45		0.50
50		0.50
55		0.50
60		0.50

Rates of disability were as follows:

Sample Ages	% of Active Members Becoming Disabled within Next Year	
	Men	Women
20	0.08%	0.10%
25	0.08%	0.10%
30	0.08%	0.10%
35	0.08%	0.10%
40	0.20%	0.36%
45	0.27%	0.41%
50	0.49%	0.57%
55	0.89%	0.77%
60	1.41%	1.02%

For purposes of the valuation we assume that 75% of disabilities are duty related and 25% of disabilities are non-duty related.

Miscellaneous and Technical Assumptions

JUNE 30, 2019

Marriage Assumption:	100% of males and 100% of females are assumed to be married for purposes of death-in-service benefits. Male spouses are assumed to be three years older than female spouses.
Pay Increase Timing:	Middle of the valuation year.
Decrement Timing:	Decrements of all types are assumed to occur mid-year.
Eligibility Testing:	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.
Decrement Relativity:	Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
Decrement Operation:	All decrements the first five years of service. Only mortality operates during retirement eligibility.
Service Credit Accruals:	It is assumed that members accrue one year of service credit per year.
Incidence of Contributions:	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.
Normal Form of Benefit:	A 60% automatic joint and survivor payment is the assumed normal form of benefit for married people.
Benefit Service:	Exact fractional service is used to determine the amount of benefit payable.
Payroll Adjustment:	Members who did not work the entire plan year had pays adjusted to reasonably reflect a full year's pay.

Glossary

Accrued Service. The service credited under the plan which was rendered before the date of the actuarial valuation.

Actuarial Accrued Liability. The difference between (i) the actuarial present value of future plan benefits, and (ii) the actuarial present value of future normal cost. Sometimes referred to as "accrued liability" or "past service liability."

Actuarial Assumptions. Estimates of future plan experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment income and salary increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (salary increases and investment income) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the "actuarial present value of future plan benefits" between the actuarial present value of future normal cost and the actuarial accrued liability. Sometimes referred to as the "actuarial funding method."

Actuarial Equivalent. A single amount or series of amounts of equal value to another single amount or series of amounts, computed on the basis of the rate(s) of interest and mortality tables used by the plan.

Actuarial Present Value. The amount of funds presently required to provide a payment or series of payments in the future. It is determined by discounting the future payments at a predetermined rate of interest, taking into account the probability of payment.

Amortization. Paying off an interest-bearing liability by means of periodic payments of interest and principal, as opposed to paying it off with a lump sum payment.

Experience Gain (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, in accordance with the actuarial cost method being used.

Funding Value of Assets. The value of assets derived by spreading the capital value changes (unrealized and realized gains and losses) in equal dollar installments over four years. This treatment removes the timing of investment activities from the valuation process.

Normal Cost. The annual cost assigned, under the actuarial funding method, to current and subsequent plan years. Sometimes referred to as "current service cost." Any payment toward the unfunded actuarial accrued liability is not part of the normal cost.

Reserve Account. An account used to indicate that funds have been set aside for a specific purpose and are not generally available for other uses.

Unfunded Actuarial Accrued Liability. The difference between the actuarial accrued liability and valuation assets. Sometimes referred to as "unfunded accrued liability."

Valuation Assets. The value of current plan assets recognized for valuation purposes.

APPENDIX 1

AMORTIZATION PAYOFF SCHEDULE

Amortization Payoff Schedule

Date	Period	Unfunded Liability (BOY)	Funded Ratio (BOY)	UAL Payment %	UAL Payment \$	Interest	Unfunded Liability (EOY)
June 30, 2019		\$ 66,295,174	61.6%				
July 1, 2020	20, 4	67,074,742	61.8%	43.13%	\$ 4,918,688	\$ 4,848,378	\$ 67,004,432
July 1, 2021	19, 3	67,004,432	62.3%	43.13%	5,090,842	4,836,727	66,750,317
July 1, 2022	18, 2	66,750,317	63.0%	43.13%	5,269,021	4,811,067	66,292,362
July 1, 2023	17, 1	66,292,362	63.6%	43.13%	5,453,437	4,769,888	65,608,813
July 1, 2024	16	65,608,813	64.5%	42.51%	5,563,500	4,714,544	64,759,858
July 1, 2025	15	64,759,858	65.5%	42.51%	5,758,223	4,643,658	63,645,293
July 1, 2026	14	63,645,293	66.5%	42.51%	5,959,760	4,552,600	62,238,133
July 1, 2027	13	62,238,133	67.7%	42.51%	6,168,352	4,439,335	60,509,116
July 1, 2028	12	60,509,116	69.1%	42.51%	6,384,244	4,301,660	58,426,531
July 1, 2029	11	58,426,531	70.6%	42.51%	6,607,693	4,137,188	55,956,026
July 1, 2030	10	55,956,026	72.3%	42.51%	6,838,962	3,943,332	53,060,396
July 1, 2031	9	53,060,396	74.1%	42.51%	7,078,326	3,717,292	49,699,362
July 1, 2032	8	49,699,362	76.2%	42.51%	7,326,067	3,456,036	45,829,331
July 1, 2033	7	45,829,331	78.5%	42.51%	7,582,479	3,156,284	41,403,135
July 1, 2034	6	41,403,135	80.9%	42.51%	7,847,866	2,814,487	36,369,756
July 1, 2035	5	36,369,756	83.6%	42.51%	8,122,542	2,426,808	30,674,022
July 1, 2036	4	30,674,022	86.4%	42.51%	8,406,830	1,989,095	24,256,287
July 1, 2037	3	24,256,287	89.5%	42.51%	8,701,070	1,496,864	17,052,081
July 1, 2038	2	17,052,081	92.7%	42.51%	9,005,607	945,266	8,991,740
July 1, 2039	1	8,991,740	96.2%	42.51%	9,320,803	329,063	-
July 1, 2040	0	-	100.0%	0.00%	-	-	-

Unfunded liability at June 30, 2019 adjusted to July 1, 2020 with payments expected to be made between the valuation date and July 1, 2020. Payment based on 7.50% interest and 3.5% wage base over 20 (and 4 for a portion) years beginning on the Fiscal Year starting July 1, 2020.

APPENDIX 2

ACTUARIAL FUNDING POLICY

City of St. Clair Shores Police and Fire Retirement System Actuarial Funding Policy

(As adopted 10-29-2015, modified 08-31-2017)

WHEREAS, the City of St. Clair Shores Police and Fire Retirement System (“Retirement System”) is established and administered pursuant to the provisions of Public Act 345 of 1937, as amended, applicable collective bargaining agreements, and applicable state and federal laws including, but not limited to Public Act 314 of 1965, as amended (“Act 314”) [MCL 38.1132 *et seq.*], and

WHEREAS, the Board of Trustees of the Retirement System (“Board”) is vested with the authority and fiduciary responsibility for the administration, management and operation of the Retirement System, and

WHEREAS, the Board, in consultation with its Actuary, has an obligation to establish the economic and demographic assumptions to be utilized in performing the required actuarial valuation of the Retirement System and in determining the required annual employer contribution to the Retirement System, and

WHEREAS, the Board is aware of upcoming changes to the accounting and reporting standards approved by the Governmental Accounting Standards Board (GASB) for public pension plans, and

WHEREAS, the Board wishes to establish a formal Actuarial Funding Policy addressing the funding objectives and actuarial assumptions to be utilized in determining the funding status of the Retirement System, therefore be it

RESOLVED, that the Board hereby adopts the following Actuarial Funding Policy:

I. GENERAL

A. Purpose

- (1) In light of upcoming changes to the GASB financial accounting and reporting standards for public pension plans, the Board of Trustees of the Retirement System desires to establish a formal Actuarial Funding Policy to ensure the systematic funding of future pension obligations of the Retirement System.

B. Policy Objectives

- (1) Maintain adequate levels of assets sufficient to fund all benefits expected to be paid to members and beneficiaries when due.
- (2) Maintain stability of employer contributions rates, consistent with other funding objectives.
- (3) Support the public policy goals of accountability and transparency.
- (4) Monitor material risks to assist in any risk management strategies the Board deems appropriate.
- (5) Promote intergenerational equity. Each generation of members and employers should incur the cost of benefits for the employees who provide services to them, rather than deferring costs to future members and employers.

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(As adopted 10-29-2015, modified 08-31-2017)

- (6) Provide a reasonable margin for adverse experience to offset risk.
- (7) Review the Plan's investment return assumption, potentially in conjunction with a periodic asset liability study and in consideration of the Board's risk profile.
- (8) Continue the systematic reduction of the Plan's Unfunded Actuarial Accrued Liabilities (UAAL).

II. LEGAL

A. Annual Actuarial Valuation

- (1) Section 20h(4) of Act 314 [MCL 38.1140h(4)], requires the Retirement System to have an actuarial valuation performed annually as follows:

Except as otherwise provided in this subsection, a system shall have an annual actuarial valuation with assets valued on a market-related basis. The actuarial present value of total projected benefits shall include all pension benefits to be provided by the system to members or beneficiaries pursuant to the terms of the system and any additional statutory or contractual agreements to provide pension benefits through the system that are in force at the actuarial valuation date, including, but not limited to, service credits purchased by members, deferred retirement option plans, early retirement programs, and postretirement adjustment programs. A system that has less than \$20,000,000.00 is only required to have an actuarial valuation as required under this subsection done every other year.

B. Annual Employer Contribution

- (1) The Board is required, pursuant to Section 20m of Act 314 [MCL 38.1140m], to annually certify the annual required contribution to be made by the employer as follows:

The governing board vested with the general administration, management, and operation of a system or other decision-making body that is responsible for implementation and supervision of any system shall confirm in the annual actuarial valuation required under section 20h and the summary annual report required under section 13 that each system under this act provides for the payment of the required employer contribution as provided in this section and shall confirm in the summary annual report that the system has received the required employer contribution for the year covered in the summary annual report. The required employer contribution is the actuarially determined contribution amount. An annual required employer contribution in a system under this act shall consist of a current service cost payment and a payment of at least the annual accrued amortized interest on any unfunded actuarial liability and the payment of the annual accrued amortized portion of the unfunded principal liability. For fiscal years that begin before January 1, 2006, the required employer contribution shall not be determined using an

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amortization period greater than 40 years. Except as otherwise provided in this section, for fiscal years that begin after December 31, 2005, the required employer contribution shall not be determined using an amortization period greater than 30 years. In a plan year, any current service cost payment may be offset by a credit for amortization of accrued assets, if any, in excess of actuarial accrued liability. A required employer contribution for a system administered under this act shall allocate the actuarial present value of future plan benefits between the current service costs to be paid in the future and the actuarial accrued liability. The governing board vested with the general administration, management, and operation of a system or other decision-making body that is responsible for implementation and supervision of a system shall act upon the recommendation of an actuary and the board and the actuary shall take into account the standards of practice of the actuarial standards board of the American academy of actuaries in making the determination of the required employer contribution.

III. POLICY

A. Actuarial Cost Method

- (1) The individual entry age normal actuarial cost method of valuation shall be utilized in determining actuarial accrued liability and normal cost with the following characteristics:
 - (a) the annual normal costs for each individual active member, payable from the date of employment to the date of retirement, are sufficient to accumulate the value of the member's benefit at the time of retirement; and
 - (b) each annual normal cost is a constant percentage of the member's year-by-year projected covered pay.
- (2) Differences in the past between assumed experience and actual experience (actuarial gains and losses) shall be factored into the actuarial accrued liability.
- (3) The normal cost shall be determined on an individual basis for each active member.

B. Asset Smoothing Method

- (1) The investment gains or losses of each valuation period, resulting from the difference between actual investment return and assumed investment return, shall be recognized annually in level amounts over a period determined by the Board in consultation with its actuary, not to exceed five (5) years in calculating the funding value of assets.

C. Amortization Method

- (1) A level percent of payroll amortization method shall be used to systematically pay off the unfunded actuarial accrued liabilities over a closed amortization period not to exceed 30 years.
- (2) Changes in liabilities associated with Plan amendments changing benefits shall be separately funded as follows:
 - (a) amendments increasing liabilities: over a closed amortization period of 5 years, and
 - (b) amendments decreasing liabilities: over a closed amortization period equal to the remaining period being used in C(1).

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- (3) Unfunded liabilities arising from assumption or method changes shall be separately funded over a closed amortization period of 10 years.
- (4) In the event that the Retirement System's assets exceed its liabilities, all amortization schedules other than those related to benefit changes shall be considered completed, and employer contributions will be set based upon the normal cost and the completion of any remaining amortizations due to benefit changes without regard to the overfunding status of the Retirement System.

D. Assumptions

- (1) The economic and demographic actuarial assumptions utilized to determine the contribution requirements and benefit values of the Retirement System shall be determined by the Board in consultation with its actuary, subject to the following limitations:
 - (a) The assumed rate of investment return shall not exceed 8.0%, compounded annually.

E. Funding Target

- (1) The targeted funded ratio of the Retirement System shall be 100%.
- (2) The employer contribution rate shall at least be equal to the normal cost unless the funded ratio of the Retirement System exceeds 120%.
- (3) A funding plan shall be developed by the Board in consultation with its actuary if the funded ratio of the Retirement System falls below 50%, which may include additional funding requirements.

F. Risk Management

- (1) Assumption Changes
 - (a) The actuarial assumptions utilized to determine the annual contribution requirements and valuations shall be those last adopted by the Board based on the most recent experience study and upon the advice and recommendation of the Board's actuary. The Board's actuary shall conduct an experience study at least once every five years. The results of the experience study shall be the basis for the actuarial assumptions recommended to the Board.
 - (b) The actuarial assumptions may be revised during the five-year period between experience studies if significant plan design changes or other significant events occur, as advised by the actuary.
- (2) Risk Measures. The following risk measures will be annually determined by the Retirement System's actuary to provide quantifiable measurements of risk as it applies to the Retirement System.
 - (a) Funded ratio;
 - (b) Unfunded actuarial accrued liabilities – the years required to pay down the unfunded liabilities of the Retirement System based upon the current funding schedule;

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- (c) Total unfunded actuarial accrued liabilities as a percentage of total payroll;
 - (d) Total assets as a percentage of total payroll; and
 - (e) Total actuarial accrued liabilities as a percentage of total payroll.
- (3) Risk Control
- (a) The Board shall carefully monitor the risk measures identified above and shall consider steps to mitigate risk, particularly as the funded ratio increases.

IV. REVIEW AND AMENDMENT

A. Periodic Review

- (1) This Actuarial Funding Policy shall be reviewed no less frequently than once every five years in conjunction with the required experience study performed by the Board's actuary, and may be reviewed at any time in the Board's discretion.

B. Amendment

- (1) The Board, in consultation with its Actuary and Legal Counsel, may amend this Actuary Funding Policy at any time as deemed necessary to address changes in the makeup, benefit structure and/or funding status of the Retirement System.

APPENDIX 3

RISK MEASURES

Risk Commentary

The determination of the accrued liability and the actuarially determined contribution requires the use of assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the actuarially determined contribution that result from the differences between actual experience and the actuarial assumptions.

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 due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Plan's funded status); and changes in plan provisions or applicable law. The scope of an actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the plan's future financial condition include:

- **Investment risk** – actual investment returns may differ from the expected returns;
- **Asset/Liability mismatch** – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
- **Contribution risk** – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
- **Salary and Payroll risk** – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
- **Longevity risk** – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
- **Other demographic risks** – members may terminate, retire or become disabled at times or with benefits other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example, if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise, if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The computed contribution rate shown on page A-2 may be considered as a minimum contribution rate that complies with the Board's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

Risk Commentary (Concluded)

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	<u>2019</u>	<u>2018</u>
Ratio of the market value of assets to payroll	9.93	9.19
Ratio of actuarial accrued liability to payroll	16.22	14.75
Ratio of actives to retirees and beneficiaries	0.56	0.61
Ratio of net cash flow to market value of assets	-5.8%	-4.7%

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 12.0 times the payroll, a return on assets 5% different than assumed would equal 60% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 17 times the payroll, a change in liability 2% other than assumed would equal 34% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.