

# City of St. Clair Shores Employees Retirement System

66th Actuarial Valuation Report  
as of June 30, 2018



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November 14, 2018

Retirement Board  
City of St. Clair Shores  
Employees Retirement System  
St. Clair Shores, Michigan

**Re: City of St. Clair Shores Employees Retirement System Actuarial Valuation as of June 30, 2018**

Dear Board Members:

The results of the June 30, 2018 Annual Actuarial Valuation of the City of St. Clair Shores Employees Retirement System are presented in this report.

This report was prepared at the request of the Board and is intended for use by the 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, 2018, and to determine the employer contribution rate for the fiscal year ending June 30, 2020. 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 findings in this report are based on data and other information through June 30, 2018. 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 (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.

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 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.

The computed contribution rate shown on A-2 may be considered as a minimum contribution rate that complies with the Board's funding objective. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the System in excess of those presented in this report be considered.

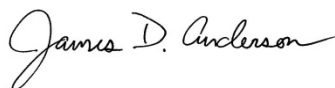
The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Section C of this report. This report includes risk metrics on page A-6, but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the System's financial condition.

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 Employees 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.

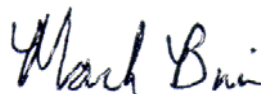
Gabriel, Roeder, Smith & Company will be pleased to review this valuation report with the Board of Trustees and answer any questions pertaining to the valuation. James D. Anderson and Mark Buis are Members of the American Academy of Actuaries (MAAA) and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

The signing actuaries are independent of the plan sponsor.

Respectfully submitted,



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



Mark Buis, FSA, FCA, EA, MAAA

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## **SECTION A**

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### **VALUATION RESULTS**

## Funding Objective

The funding objective of the Retirement System is to establish and receive sufficient contributions which will accumulate assets during each member's working years which, together with investment income, will be sufficient to pay promised benefits after retirement.

## Contributions

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, 2019 are shown on page A-2.

The Board of Trustees of the City of St. Clair Shores Employees 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

Contributions for	For Fiscal Year Beginning July 1,	
	2019	2018
<b>NORMAL COST</b>		
Age and service pensions	\$ 400,976	\$ 418,888
Death before retirement pensions	12,509	13,376
Disability pensions	24,681	25,696
<b>Total</b>	<b>438,166</b>	<b>457,960</b>
<b>MEMBERS' CONTRIBUTIONS</b>		
Gross contributions	28,738	30,273
Less prospective refunds	3,719	3,872
<b>Available for pensions</b>	<b>25,019</b>	<b>26,401</b>
<b>CITY'S NORMAL COST</b>	<b>413,147</b>	<b>431,559</b>
<b>AMORTIZATION OF UNFUNDED ACTUARIAL ACCRUED LIABILITIES<sup>#</sup></b>		
	\$2,342,217	\$2,248,480
<b>TOTAL CITY CONTRIBUTIONS <sup>*^</sup></b>	<b>\$2,755,364</b>	<b>\$2,680,039</b>

<sup>#</sup> *Unfunded actuarial accrued liabilities were financed as a level dollar amount over a period of 23 years (24 years for the fiscal year beginning July 1, 2018).*

<sup>\*</sup> *Contribution amounts for prior fiscal years are shown on page A-6.*

<sup>^</sup> *The estimated contribution as a percentage of payroll for the fiscal year beginning July 1, 2019 is 81.5%. This estimated contribution is for informational purposes only and is based on projected payroll of \$3,380,907. The Plan is closed to new hires and it is our understanding the City makes contributions on the dollar basis noted above. To the extent that actual payroll is different, the actual percentage will vary.*

## Determination of Unfunded Actuarial Accrued Liability

	June 30,	
	2018	2017
A. Accrued Liability		
1. For retirees and beneficiaries	\$ 45,918,493	\$ 45,848,265
2. For vested terminated members	2,089,713	2,125,129
3. For present active members		
a. Value of expected future benefit payments	21,426,000	21,146,160
b. Value of future normal costs	2,762,127	2,952,537
c. Active member accrued liability: (a) - (b)	18,663,873	18,193,623
4. Total accrued liability	66,672,079	66,167,017
B. Present Assets (Funding Value)	40,085,435	40,232,995
C. Unfunded Accrued Liability: (A.4) - (B)	26,586,644	25,934,022
D. Funding Ratio: (B) / (A.4)	60.1%	60.8%
E. Funding Ratio: Market Value Basis	61.1%	59.1%



## Development of Funding Value of Assets

Year Ended June 30:	2017	2018	2019	2020	2021
A. Funding Value Beginning of Year	\$39,907,111	\$40,232,995			
B. Market Value End of Year	39,096,042	40,762,907			
C. Market Value Beginning of Year	36,607,467	39,096,042			
D. Non-Investment Net Cash Flow	(2,212,273)	(2,153,335)			
E. Investment Income					
E1. Market Total: B - C - D	4,700,848	3,820,200			
E2. Assumed Rate of Investment Return	7.50%	7.50%			
E3. Amount for Immediate Recognition	2,910,073	2,936,725			
E4. Amount for Phased-In Recognition: E1-E3	1,790,775	883,475			
F. Phased-In Recognition of Investment Income					
F1. Current Year: 0.25 x E4	447,694	220,869			
F2. First Prior Year	(880,523)	447,694	\$ 220,869		
F3. Second Prior Year	(718,992)	(880,523)	447,694	\$ 220,869	
F4. Third Prior Year	779,905	(718,990)	(880,521)	447,693	\$ 220,868
F5. Total Recognized Investment Gain (Loss)	(371,916)	(930,950)	(211,958)	668,562	220,868
G. Funding Value End of Year: A + D + E3 + F5	40,232,995	40,085,435			
H. Difference between Market and Funding Value	(1,136,953)	677,472			
I. Recognized Rate of Return - Funding Value	6.54%	5.12%			
J. Recognized Rate of Return - Market Value	13.24%	10.05%			

The Funding Value of Assets recognizes assumed investment income (line E.3) fully each year. Differences between actual and assumed investment income (line E.4) are phased-in over a closed 4-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 three 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 expected 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	\$ 25,934,022
(2) Total normal cost	487,699
(3) Actual contributions for pensions	2,679,507
(4) Interest accrual ((1) + 1/2 [(2)-(3)]) x 7.50%	1,862,859
(5) Expected UAAL* before changes (1) + (2) - (3) + (4)	25,605,073
(6) Change from benefit improvements	0
(7) Change in actuarial assumptions	0
(8) Expected UAAL* after changes (5) + (6) + (7)	25,605,073
(9) Actual UAAL*	26,586,644
(10) Gain (Loss) (8) - (9)	(981,571)
(11) Gain (Loss) as percent of actuarial accrued liabilities at start of year (\$66,167,017)	(1.5)%

\* *Unfunded Actuarial Accrued Liabilities.*

Valuation Date	Experience Gain (Loss) as % of Beginning Accrued Liability
6-30-09	2.3 %
6-30-10	(7.1)
6-30-11	(6.1)
6-30-12	(4.1)
6-30-13	(0.4)
6-30-14	0.8
6-30-15	(2.3)
6-30-16	(1.3)
6-30-17	(0.9)
6-30-18	(1.5)

## Comparative Schedule and Risk Factors

Valuation Date	Actuarial Accrued Liabilities & Reserves	Valuation Assets	Percent Funded	Unfunded Actuarial Accrued Liabilities & Reserves		City's Contribution	Covered Payroll
				Dollars	Amortization Period		
06/30/09	\$54,466,034	\$43,364,264	79.6 %	\$ 11,101,770	24 yrs.	\$1,812,824 #	\$6,726,665
06/30/10	55,767,178	41,130,494	73.8	14,636,684	23	2,090,393 *	6,371,328
06/30/11	56,714,374	38,612,848	68.1	18,101,526	22	2,379,350 *	5,865,873
06/30/12	56,805,539	36,435,503	64.1	20,370,036	21	2,561,038	5,299,757
06/30/13	57,648,592	37,291,564	64.7	20,357,028	20	2,512,506	4,599,115
06/30/14	58,329,977	38,900,248	66.7	19,429,729	19	2,462,821	4,611,639
06/30/15	59,991,212	39,768,186	66.3	20,223,026	18	2,554,204 #	4,282,301
06/30/16	65,444,267	39,907,111	61.0	25,537,156	25	2,644,314 #	4,261,711
06/30/17	66,167,017	40,232,995	60.8	25,934,022	24	2,680,039	4,118,454
06/30/18	66,672,079	40,085,435	60.1	26,586,644	23	2,755,364	4,045,968

\* Retirement System amended.

# Revised actuarial assumptions and/or methods.

**Percent Funded is the Ratio of Valuation Assets to Actuarial Accrued Liabilities.** This 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%.

## Schedule of Employer Contributions

Fiscal Yr. Ended June 30	Val. Yr. Ended June 30	Computed Dollar Contribution Based on Valuation Payroll	Annual Required Contribution Based on Actual Payroll
2011	2009 #	\$ 1,812,824	\$ 1,808,157
2012	2010 *	2,090,393	2,095,060
2013	2011 *	2,379,350	2,379,350
2014	2012	2,561,038	2,561,038
2015	2013	2,512,506	2,512,506
2016	2014	2,462,821	2,462,821
2017	2015 #	2,554,204	2,554,204
2018	2016 #	2,644,314	2,644,314
2019	2017	2,680,039	-
2020	2018	2,755,364	-

\* Retirement System amended.

# Revised actuarial assumptions and/or methods.

# Comments

## Actuarial Experience

The Actuarially determined employer contribution increased from \$2,680,039 last year to \$2,755,364 this year. This was primarily attributable to unfavorable investment experience. While the investment return for the past year exceeded the assumed rate of return of 7.5%, when combined with asset gains and losses from the prior three years, the Retirement System experienced a net asset loss of \$930,950 for the year.

## 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 recommendations 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; and
- Amortization period no longer than 20 years for Pension Plans and 30 years for Retiree Health Plans.

We are unable to certify that the current valuation assumptions and/or methods used by the System match or fall in the range of uniform assumptions established by the Treasurer for PA 202 reporting purposes. Therefore, the results in the valuation would most likely not be suitable for the reporting requirements. We can either:

- Perform calculations based on a different set of assumptions consistent with the Treasurer's established uniform assumptions for PA 202 reporting purposes; or
- Discuss with the Board the suitability of using the Treasurer's established assumptions for funding purposes if policymakers wish to consider that change.

## Looking Ahead

The current investment return assumption is 7.5%. Due to the closed nature of the System, increasing liquidity needs and lower interest rates on fixed income investments, it may be difficult to achieve this return over the long-term. Additionally, new guidance regarding the selection of economic assumptions has been provided by Actuarial Standards of Practice (ASOP) No. 27. The new standards tighten the range of reasonable assumptions that the actuary is allowed to use with regard to the investment return assumption. The current assumption of 7.5% is at the upper end of the reasonable range. We recommend that consideration be given to lowering this assumption to 7.25% effective with the June 30, 2019 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 individually and in the aggregate, a reasonable representation of the past and anticipated future experience of the System.

# Comments (Concluded)

## 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 dollar amounts will eventually decrease as active payroll declines due to the closed nature of the plan;
- 2) Amortization payment dollar amounts will remain level over the next 23 years;
- 3) The unfunded actuarial accrued liability will be fully amortized after 23 years; and
- 4) The funded status of the plan will increase gradually towards a 100% funded ratio.

### 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**

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### **VALUATION DATA**

# Brief Summary of Benefit Provisions (June 30, 2018)

## Regular Retirement (No reduction factor for age)

**Eligibility** - Age 50 with 25 years of service, or age 60 with 10 or more years of service.

**Annual Amount – AFSCME, Court Non-Union, Court Clerical, and PEA:** Total service multiplied by 2.5% of average final compensation with a maximum of 80% of average final compensation.

**Dispatchers:** Total service multiplied by 2.5% of average final compensation with a maximum of 75% of average final compensation.

**AR4:** Total service multiplied by 2.5% of average final compensation with a maximum of 62.5% of average final compensation. Maximum benefit for AR4 members cannot exceed base pay as of termination date.

**Type of Average Final Compensation** - Highest 5 non-consecutive years out of last 10. Court Clerical and Dispatchers – Highest 5 consecutive years out of last 10.

## Deferred Retirement (Vested Benefit)

**Eligibility** - 10 years of service, benefit begins at age 60.

**Annual Amount** - Computed as regular retirement but based on average final compensation and service at time of termination.

## Duty Disability Retirement

**Eligibility** - No age or service requirement.

**Annual Amount** - Computed as regular retirement with a minimum benefit of 20% of average final compensation. Upon termination of worker's compensation or age 60, whichever occurs first, benefit is recomputed to include additional service credit for the period worker's compensation was paid.

## Non-Duty Disability Retirement

**Eligibility** - 10 or more years of service.

**Annual Amount** - Computed as regular retirement.

## Death-in-Service Survivor Pension

**Eligibility** - 10 years of service.

**Annual Amount** - Computed as regular retirement but actuarially reduced in accordance with a 100% joint and survivor election.

# Brief Summary of Benefit Provisions (June 30, 2018) (Concluded)

## Post-Retirement Cost-of-Living Adjustments

**Retirees effective 7/1/93 (Court Clerical effective 1/1/03):** 5% cost-of-living increase at age 60 or five years after retirement, whichever is later, with a second increase of 5% five years after the first increase.

## Member Contributions

<b>AR4 and Court Non-Union:</b>	None
<b>AFSCME, Court Clerical, Dispatchers, and PEA:</b>	1.0% of pay

## City's Contributions

Actuarially determined amounts which are sufficient to at least cover the requirements of the funding objective stated on page A-1.

## New Hires

The Plan is closed. No new hires will participate in this Retirement System.



## Summary of Asset Information Furnished for the Valuation Balance Sheet as of June 30, 2018

Current Assets		Reserves for	
Cash & Equivalents	\$ 3,157,917	Employees' Contributions	\$ 613,447
Receivables & Accruals	52,991	Employer Contributions	35,630,110
Bonds	3,918,146	Retired Benefit Payments	3,449,800
Common Stocks	11,050,522	Excess Earnings Reserve	1,069,550
ADR	4,425,437		
Foreign Stocks	875,751		
Real Estate	504,433		
Mortgages	0		
Foreign Gov. & Agencies	0		
Other Fixed Income	2,332,689		
Other Equities	14,551,335		
Other Assets (Securities lending)	948,767		
Accounts payable	(66,157)		
Amount due to Broker (Securities lending)	(988,924)		
<b>Total Current Assets</b>	<b>\$40,762,907</b>	<b>Total Reserves</b>	<b>\$40,762,907</b>
Market Adjustment*	(677,472)	Market Adjustment*	(677,472)
<b>Total Valuation Assets**</b>	<b>\$40,085,435</b>	<b>Total Valuation Assets**</b>	<b>\$40,085,435</b>

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

\*\* Includes the Excess Earnings Reserve.

### Revenues and Expenditures

Balance July 1, 2017	\$40,232,995
<b>Revenues</b>	
Employees' contributions	35,193
Employer contributions	2,644,314
Medicare reimbursement <sup>#</sup>	318,684
Recognized investment income (valuation purposes)	2,005,775
<b>Expenditures</b>	
Benefit payments	4,832,842
Refund of member contributions	0
Medicare payments <sup>#</sup>	318,684
<b>Balance June 30, 2018</b>	<b>\$40,085,435</b>

<sup>#</sup> Medicare payments to retirees are paid monthly by the custodian from the Retirement System's assets. At the end of each quarter, these amounts are reimbursed to the System by the City.

## Retiree and Beneficiary Comparative Schedule

Year Ended June 30	Added to Rolls		Removed from Rolls		Rolls End of Year				% Incr. in Annual Pensions	Average Pension	Expected Removals	
	No.	Annual Pensions	No.	Annual Pensions	No.	Active Per Retired	Annual Pensions				No.	\$
							Dollars	% of Pay*				
1994	13	\$ 182,612	1	\$ 8,297	161	1.0	\$ 1,553,494	26.6 %	12.6 %	\$ 9,649	4.6	\$ 35,545
1995	11	221,649	6	43,953	166	0.9	1,731,190	30.8	11.4	10,429	5.2	41,238
1996	13	251,022	6	69,322	173	1.1	1,912,890	33.3	10.5	11,057	5.5	45,700
1997	11	162,889	8	78,664	176	0.9	1,997,115	31.6	4.4	11,347	5.7	48,811
1998	9	187,510	6	43,223	179	0.9	2,141,402	32.8	7.2	11,963	6.2	53,260
1999	16	289,747	12	163,410	183	0.9	2,267,739	32.0	5.9	12,392	5.6	49,841
2000	6	163,121	8	66,733	181	1.0	2,364,127	31.3	4.3	13,061	5.8	52,574
2001	8	147,094	5	38,062	184	0.9	2,473,159	33.8	4.6	13,441	5.9	56,028
2002	9	190,085	11	88,107	182	0.9	2,575,137	32.7	4.1	14,149	6.0	57,982
2003	8	233,641	4	30,096	186	0.8	2,778,682	37.9	7.9	14,939	6.0	61,381
2004	15	454,673	10	96,771	191	0.8	3,136,584	45.0	12.9	16,422	6.5	66,604
2005	14	440,795	10	51,437	195	0.7	3,525,942	54.0	12.4	18,082	6.7	70,640
2006	6	230,143	9	128,414	192	0.7	3,627,671	53.5	2.9	18,894	7.2	84,343
2007	14	271,387	8	69,238	198	0.6	3,829,820	58.4	5.6	19,343	7.3	89,201
2008	6	108,961	5	19,817	199	0.6	3,918,964	59.0	2.3	19,693	7.6	96,874
2009	5	101,229	6	90,820	198	0.6	3,929,373	58.4	0.3	19,845	7.2	90,602
2010	12	206,333	6	72,949	204	0.5	4,062,757	63.8	3.4	19,915	7.7	98,271
2011	12	225,699	6	98,440	210	0.5	4,190,016	71.4	3.1	19,952	8.4	107,628
2012	8	190,569	5	85,405	213	0.4	4,295,180	81.0	2.5	20,165	9.0	114,822
2013	18	444,226	14	195,321	217	0.4	4,544,085	98.8	5.8	20,940	9.6	123,626
2014	7	176,718	10	118,734	214	0.4	4,602,069	99.8	1.3	21,505	9.4	129,877
2015	7	154,294	11	113,586	210	0.3	4,642,777	108.4	0.9	22,108	9.4	135,332
2016	10	230,088	8	199,859	212	0.3	4,673,006	109.7	0.7	22,042	9.5	143,393
2017	6	177,886	8	103,749	210	0.3	4,747,143	115.3	1.6	22,605	9.2	141,963
2018	6	174,983	8	150,498	208	0.3	4,771,628	117.9	0.5	22,941	9.2	145,448

\* Pay used for this purpose is the payroll for the now closed group of active members.

## Retiree and Beneficiary Data June 30, 2018 Tabulated by Type of Pensions Being Paid

Type of Pensions Being Paid	No.	Annual Pensions
Age and Service Pensions		
Regular pension - benefit		
Terminating at death of retirant	77	\$1,767,172
Option A pension - joint and survivor benefit	62	1,635,989
Option B pension - modified joint and survivor benefit	24	678,970
Survivor beneficiary of deceased age and service retiree	23	378,192
Other - benefit being paid to an ex-spouse	<u>10</u>	<u>91,176</u>
Total age and service pensions	196	\$4,551,499
Casualty Pensions		
Duty disability		
Regular pension	2	\$ 35,190
Non-Duty Disability pensions		
Regular pension	5	90,529
Option A pension		
Option B pension	1	10,617
Survivor beneficiary of deceased non-duty disability retiree	<u>2</u>	<u>6,430</u>
Total	10	142,766
Non-duty death - spouse	2	77,363
Total casualty pensions	<u>12</u>	<u>220,129</u>
Total Pensions Being Paid	208	\$4,771,628

## Retiree and Beneficiary Data June 30, 2018 Tabulated by Age

Attained Age	No.	Annual Pensions
45 - 49	1	\$ 7,296
50 - 54	6	153,788
55 - 59	6	166,196
60 - 64	33	1,048,704
65	7	158,613
66	9	204,067
67	9	237,849
68	10	209,539
69	8	290,224
70	11	276,672
71	8	211,342
72	3	121,102
73	13	379,324
74	3	40,320
75	7	112,155
76	4	74,240
77	2	56,803
78	3	104,465
79	3	83,466
80	7	134,719
81	1	11,434
82	4	58,862
83	4	52,532
84	2	15,295
85	6	68,228
86	8	119,460
87	3	87,597
88	4	63,090
89	7	91,254
90	2	17,079
91	3	28,481
92	3	35,535
93	2	9,385
95	3	15,714
97	2	23,950
103	1	2,848
<b>Totals</b>	<b>208</b>	<b>\$4,771,628</b>

Average Age at Retirement: 57.8 years.

Average Age Now: 73.8 years.

## Comparative Schedules Active Members in Valuation

Valuation Date June 30	Active Members	Valuation Payroll	Average			
			Age	Service	Pay	% Inc.
1994	160	\$5,838,352	45.5 yrs.	13.5 yrs.	\$36,490	13.2 %
1995	157	5,623,083	44.7	13.4	35,816	(1.8)
1996	156	5,752,354	44.8	13.0	36,874	2.9
1997	163	6,311,705	44.5	12.2	38,722	5.0
1998	162	6,520,030	44.7	12.2	40,247	3.9
1999	167	7,090,025	44.4	11.1	42,455	5.5
2000	173	7,543,720	44.5	11.2	43,605	2.7
2001	169	7,316,759	45.1	11.5	43,294	(0.7)
2002	169	7,868,956	45.8	11.5	46,562	7.5
2003	154	7,324,919	46.6	11.4	47,564	2.2
2004	145	6,969,930	46.7	11.1	48,068	1.1
2005	134	6,532,301	47.0	10.7	48,749	1.4
2006	134	6,783,425	47.5	10.6	50,623	3.8
2007	124	6,557,936	47.2	11.4	52,887	4.5
2008	121	6,647,356	47.5	12.1	54,937	3.9
2009	117	6,726,665	48.3	12.8	57,493	4.7
2010	109	6,371,328	48.8	13.6	58,453	1.7
2011	98	5,865,873	49.0	14.6	59,856	2.4
2012	92	5,299,757	49.5	15.2	57,606	(3.8)
2013	78	4,599,115	48.8	15.6	58,963	2.4
2014	75	4,611,639	49.4	16.4	61,489	4.3
2015	67	4,282,301	49.8	17.1	63,915	3.9
2016	66	4,261,711	50.6	18.1	64,571	1.0
2017	62	4,118,454	51.2	18.8	66,427	2.9
2018	59	4,045,968	52.0	19.6	68,576	3.2

### Active Members Added to and Removed from Rolls

Year Ended	Number Added During Year		Terminations During Year										Active Members End of Year
			Normal Retirement		Disability Retirement		Died-in-Service		Withdrawal				
	A	E	A	E	A	E	A	E	Vested	Other	Total		
06/30/14	0	0	3	4.8	0	0.3	0	0.2	0	0	0	1.6	75
06/30/15	0	0	4	5.9	0	0.3	0	0.2	3	1	4	1.4	67
06/30/16	0	0	1	5.5	0	0.3	0	0.2	0	0	0	1.3	66
06/30/17	0	0	4	6.7	0	0.3	0	0.1	0	0	0	1.1	62
06/30/18	0	0	3	6.8	0	0.2	0	0.1	0	0	0	1.0	59

A represents actual number.

E represents expected number.

## Active Members June 30, 2018 By Age and Years of Service

Age	Years of Service to Valuation Date							Totals		
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary	Average
30-34			1					1	\$ 68,779	\$68,779
35-39			3	2				5	334,120	66,824
40-44			2	6	1			9	535,420	59,491
45-49			2	4	2			8	529,866	66,233
50-54			2	3	4			9	583,995	64,888
55-59			1	4	5	1	1	12	868,629	72,386
60				2			1	3	270,315	90,105
61				3	2		2	7	420,080	60,011
62				1				1	45,484	45,484
63					1			1	115,789	115,789
65+				2	1			3	273,491	91,164
<b>Totals</b>			<b>11</b>	<b>27</b>	<b>16</b>	<b>1</b>	<b>4</b>	<b>59</b>	<b>\$4,045,968</b>	<b>\$68,576</b>

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

Age: 52.0 years  
 Service: 19.6 years  
 Annual Pay: \$68,576

## Inactive Vested Members June 30, 2018 Tabulated by Age

Age	No.	Estimated Deferred Annual Pensions
45	1	\$ 6,691
48	2	82,910
49	1	12,215
50	1	12,983
51	2	25,999
52	1	28,594
53	1	21,403
54	4	42,013
56	2	20,946
59	3	42,647
<b>Totals</b>	<b>18</b>	<b>\$296,401</b>

Average Age Now: 53.5 years

## SECTION C

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### VALUATION METHODS AND ASSUMPTIONS



## Actuarial Cost Method

The actuarial cost method is the procedure for allocating the actuarial present value of benefits and expenses to time periods. The method used for your valuation is known as the *individual entry-age actuarial cost method*, and has the following characteristics:

- The annual normal cost for each individual active member is sufficient to accumulate the value of the member's pension at the time of retirement.
- Each annual normal cost is a constant percentage of the member's year-by-year projected pensionable compensation.

The unfunded actuarial accrued liability was financed as a level dollar of member payroll over a period of 23 years. This unfunded actuarial accrued liability payment reflects any payment 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 are derived as follows: prior year valuation assets are increased by contribution and expected investment income (net of expenses) and reduced by refunds and benefit payments. To this amount is added 25% of the difference between expected and actual investment income for each of the previous four years.

**Excess Earning Reserve:** An amount equal to the market value of the Excess Earning 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 demographic information furnished by the Plan Sponsor, 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
- 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.

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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.

## Valuation Assumptions

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

Investment Return	7.50%
Wage Inflation	3.50%
Price Inflation	2.75%
Spread Between Investment Return and Wage Inflation	4.00%
Spread Between Investment Return and Price Inflation	4.75%

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

Economic experience during the last 5 years has been as follows:

	Year Ending					5-Year Average
	6/30/18	6/30/17	6/30/16	6/30/15	6/30/14	
1) Nominal rate of return <sup>#</sup>	5.1 %	6.5 %	6.0 %	6.0 %	10.1 %	6.7%
2) Increase in CPI	2.9	1.6	1.0	0.1	2.1	1.5%
3) Average salary increase*	2.9	3.0	1.1	1.4	4.2	2.5%
4) Real return:						
- investment purposes	2.2	4.9	5.0	5.9	8.0	5.2%
- funding purposes	2.2	3.5	4.9	4.6	5.9	4.2%
- assumption	4.0	4.0	4.0	4.0	4.0	4.0%

<sup>#</sup> *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.*

## Valuation Assumptions (Continued)

*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. Base wage growth was set to 2.5% for 2012-2019.

### Sample Salary Adjustment Factors Used to Project Salaries in Years 2020 and Beyond

Sample Ages	Percent Increase in Salary During Next Year	
	Base	Promotion & Seniority
20	3.5 %	3.7 %
25	3.5	3.2
30	3.5	2.7
35	3.5	2.2
40	3.5	1.4
45	3.5	0.7
50	3.5	0.2
55	3.5	0.0

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

Retirement Ages	Percent of Active Members Retiring within Next Year
50	20 %
51	20
52	20
53	20
54	20
55	25
56	25
57	25
58	25
59	25
60	30
61	30
62	30
63	30
64	30
65	100

These rates were first used for the June 30, 2008 valuation.

## Valuation Assumptions (Continued)

**Mortality.** This assumption is used to measure the probabilities of members dying before retirement and the probabilities of each benefit payment being made after retirement. The mortality rates utilized are based upon the RP-2014 tables, as extended, and include a margin for future mortality improvement projected using a fully generational improvement scale. These rates were first used for the June 30, 2016 valuation.

Descriptions of the tables and sample life expectancies are as follows:

- **Healthy Pre-Retirement:** The 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.
- **Healthy Post-Retirement:** 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.
- **Disability Retirement:** The RP-2014 Disabled Mortality Table, 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.

Sample Attained Ages	Healthy Pre- Retirement		Healthy Post-Retirement		Disabled Retirement	
	Future Life Expectancy (Years)*		Future Life Expectancy (Years)*		Future Life Expectancy (Years)*	
	Men	Women	Men	Women	Men	Women
55	30.48	35.65	29.30	32.20	22.19	25.99
60	25.63	30.64	24.72	27.45	19.09	22.36
65	21.07	25.73	20.37	22.87	16.08	18.76
70	16.88	20.95	16.31	18.51	13.15	15.25
75	13.05	16.40	12.62	14.50	10.40	12.01
80	9.64	12.12	9.41	10.95	7.96	9.24

\* Based on retirements in 2018. Retirements in future years will reflect improvements in life expectancy.

## Valuation Assumptions (Concluded)

**Rates of separation from active membership** are represented by the following table: (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	15.00 %
	1	12.00
	2	10.00
	3	8.00
	4	6.00
25	5 & Over	5.00
30		5.00
35		4.50
40		3.00
45		2.60
50		1.50
55		1.50
60		1.50

The rates were first used for the June 30, 2008 valuation.

**Vested members** who terminate with a benefit worth less than 100% of their own accumulated contributions were assumed to forfeit their vested benefit.

**Rates of disability** are represented by the following table:

Sample Ages	Percent Becoming Disabled within Next Year
20	0.03%
25	0.05%
30	0.07%
35	0.13%
40	0.19%
45	0.28%
50	0.45%
55	0.76%
60	1.10%

These rates were first used for the June 30, 1986 valuation. For purposes of the valuation we assume that all disabilities are ordinary.

# Miscellaneous and Technical Assumptions

## June 30, 2018

<b>Marriage Assumption:</b>	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.
<b>Pay Increase Timing:</b>	Beginning of the valuation year.
<b>Decrement Timing:</b>	Decrements of all types are assumed to occur mid-year.
<b>Eligibility Testing:</b>	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.
<b>Decrement Operation:</b>	All decrements the first 5 years of service. Only mortality operates during retirement eligibility.
<b>Service Credit Accruals:</b>	It is assumed that members accrue one year of service credit per year.
<b>Incidence of Contributions:</b>	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.
<b>Normal Form of Benefit:</b>	Straight life benefit terminating at death of retiree.
<b>Benefit Service:</b>	Exact fractional service is used to determine the amount of benefit payable.
<b>Payroll Adjustment:</b>	Members who did not work the entire plan year had pays adjusted to reasonably reflect a full year's pay.
<b>Assumption Rationale:</b>	Certain actuarial assumptions were based upon the results of an assumption study for the City of St. Clair Shores Employees Retirement System. A report dated August 11, 2016 presented the results of this study. Other assumptions were based upon an experience study dated, September 23, 2008. We believe these assumptions continue to be suitable for purposes of this study.

## Glossary

**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."

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

**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 gain 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.



## Glossary (Concluded)

**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

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## Amortization Payoff Schedule

Date	Period	Unfunded Liability (BOY)	Funded Ratio (BOY)	UAL Payment \$	Interest	Unfunded Liability (EOY)
June 30, 2018		\$ 26,586,644	60.1%			
July 1, 2019	23	26,249,369	60.8%	\$ 2,342,218	\$ 1,881,928	\$ 25,789,079
July 1, 2020	22	25,789,079	61.6%	2,342,218	1,847,406	25,294,267
July 1, 2021	21	25,294,267	62.4%	2,342,218	1,810,295	24,762,345
July 1, 2022	20	24,762,345	63.2%	2,342,218	1,770,401	24,190,528
July 1, 2023	19	24,190,528	63.9%	2,342,218	1,727,515	23,575,825
July 1, 2024	18	23,575,825	64.7%	2,342,218	1,681,412	22,915,020
July 1, 2025	17	22,915,020	65.4%	2,342,218	1,631,852	22,204,653
July 1, 2026	16	22,204,653	66.1%	2,342,218	1,578,574	21,441,010
July 1, 2027	15	21,441,010	66.9%	2,342,218	1,521,301	20,620,093
July 1, 2028	14	20,620,093	67.7%	2,342,218	1,459,732	19,737,608
July 1, 2029	13	19,737,608	68.6%	2,342,218	1,393,546	18,788,935
July 1, 2030	12	18,788,935	69.5%	2,342,218	1,322,396	17,769,113
July 1, 2031	11	17,769,113	70.5%	2,342,218	1,245,909	16,672,804
July 1, 2032	10	16,672,804	71.7%	2,342,218	1,163,686	15,494,272
July 1, 2033	9	15,494,272	72.9%	2,342,218	1,075,296	14,227,350
July 1, 2034	8	14,227,350	74.4%	2,342,218	980,277	12,865,408
July 1, 2035	7	12,865,408	76.1%	2,342,218	878,131	11,401,320
July 1, 2036	6	11,401,320	78.1%	2,342,218	768,324	9,827,427
July 1, 2037	5	9,827,427	80.5%	2,342,218	650,282	8,135,490
July 1, 2038	4	8,135,490	83.2%	2,342,218	523,387	6,316,659
July 1, 2039	3	6,316,659	86.5%	2,342,218	386,975	4,361,415
July 1, 2040	2	4,361,415	90.3%	2,342,218	240,332	2,259,529
July 1, 2041	1	2,259,529	94.8%	2,342,218	82,690	(0)
July 1, 2042	0	(0)	100.0%	-	(0)	(0)

Unfunded liability at June 30, 2018 adjusted to July 1, 2019 with payments expected to be made between the valuation date and July 1, 2019. Payment based on 7.50% interest over a period of 23 years beginning on the Fiscal Year starting July 1, 2019.