City of Battle Creek Police and Fire Retirement System

Fifty-Fifth Actuarial Valuation Report

June 30, 2017

June 30, 2017 Actuarial Valuation
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December 21, 2017

Retirement Board
City of Battle Creek
Police and Fire Retirement System
Battle Creek, Michigan

Dear Board Members:

Submitted in this report are the results of the Fifty-Fifth Annual Actuarial Valuation of the assets, actuarial values, and contribution requirements associated with benefits provided by the City of Battle Creek Police and Fire Retirement System, which is based on Act No. 345 of the Public Acts of 1937, as amended. The purpose of the annual valuation is to measure the Retirement System's funding progress and to determine the City's contribution rate for the ensuing fiscal year in accordance with the established funding policy.

Information required by Statement No. 67 of the Governmental Accounting Standards Board ("GASB") that was first effective for fiscal year 2014 is provided in a separate report.

The date of the valuation was June 30, 2017.

This report should not be relied on for any purpose other than those described above. It 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 Retirement System only in its entirety and only with the permission of the Board. GRS is not responsible for unauthorized use of this report.

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. Due to the limited scope of the actuary's assignment, the actuary did not perform an analysis of the potential range of such future measurements.

The valuation was based upon statistical data furnished by the City Treasurer concerning Retirement System benefits, financial transactions, individual members, terminated members and retirants and beneficiaries. Data was checked for internal and year-to-year consistency, but was not audited. This information is summarized in Section B.

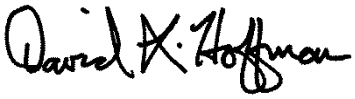
To the best of our knowledge, this report is complete and accurate and the valuation was conducted in accordance with standards of practice prescribed by the Actuarial Standards Board and in compliance with Act No. 345 of the Public Acts of 1937, as amended. The actuarial assumptions used for the valuation produce results which we believe are reasonable.

Derek Henning is a Member of the American Academy of Actuaries (MAAA) and meets the qualifications of the Academy of Actuaries to render the actuarial opinions contained herein.

The signing individuals are independent of the plan sponsor.

Respectfully submitted,

Derek Henning, ASA, MAAA



David L. Hoffman

DH/DLH:ah

SECTION A

VALUATION RESULTS, COMMENTS, RECOMMENDATIONS, AND CONCLUSIONS

Financial Objective

The financial 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. This objective meets the requirements of Act No. 345 of the Public Acts of 1937, as amended, and the Michigan constitution.

Contribution Rates

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

Contributions which are intended to satisfy the financial objective are determined by an annual actuarial valuation and are sufficient to:

(1) cover the actuarial present value of benefits assigned to the current year by the actuarial cost methods described in Section C (the normal cost); and

(2) amortize over a period of future years the actuarial present value of benefits not covered by valuation assets and anticipated future normal costs (unfunded actuarial accrued liability).

Computed contributions for the fiscal year beginning July 1, 2018 are shown on page A-2.

Contributions Computed to Meet the Financial Objective of the Retirement System

Contributions for	Contributions Expressed as Percents-of-Payroll	
Fiscal Year Beginning July 1	**2018**	**2017**
Normal Cost		
Age and service benefits	23.39 %	22.23 %
Death and disability benefits	1.55 %	1.45 %
Termination benefits		
Deferred age & service benefits	2.06 %	1.96 %
Refunds of member contributions	0.51 %	0.46 %
Total Normal Cost	27.51 %	26.10 %
Amortization Payment/(Credit)	15.69 %	13.45 %
Total Contribution Requirement	43.20 %	39.55 %
Less average member portion	9.84 %	8.54 %
City portion	33.36 %	31.01 %

Please refer to page C-6 for information on the determination of the amortization payment.

A procedure for determining dollar contribution amounts is described on page A-3.

Comparative contribution amounts for prior fiscal years are shown on page A-7.

Determining Dollar Contributions

For any period of time, the percent-of-payroll contribution rate needs to be converted to dollar amounts. We recommend the following procedure.

Contribute dollar amounts at the end of each payroll period which are equal to the City's percent-of-payroll contribution requirement 33.36% multiplied by the covered active member payroll for the period. Adjustments should be made as necessary to exclude items of pay that are not covered compensation for Retirement System benefits and to include special payments that are covered compensation (overtime, longevity pay, etc.).

The above amounts are assumed to be contributed, on average, halfway through the fiscal year. If contributions are made on a later schedule, interest should be added at the rate of 0.53% for each month of delay.

Financial Objective Achievement Tests

The Retirement System's financial objective is to meet long-term benefit promises through contributions that remain approximately level from year-to-year as a percent of active member payroll. If the contributions to the System are level in concept and soundly executed, the System will ***pay all promised benefits when due -- the ultimate test of financial soundness***. Testing for level contribution rates is ***the long-term solvency test***. Year-by-year computed contribution rates are displayed on page A-7.

There is no single all-encompassing test to measure a Retirement System's funding progress and current funded status.

The following pages presents two tests measuring the funding progress of the Retirement System. The two tests are described below.

TEST 1 - The ratio of Valuation Assets (VA) to the Entry Age Actuarial Accrued Liability (EAAL) - a plan continuation test. The ratio is expected to gradually increase in the absence of benefit improvements and changes in actuarial assumptions.

TEST 2 - The ratio of the Unfunded Actuarial Accrued Liability (UAAL) to Member Payroll (MP) - a plan continuation test. In a soundly financed retirement system, the amount of the unfunded actuarial accrued liability will be controlled and prevented from increasing in the absence of benefit increases or strengthening of actuarial assumptions. However, in an inflationary environment it is seldom practical to impose this control on dollar amounts which are depreciating in value. The ratio is a relative index of condition where inflation is present in both items. The ratio is expected to gradually decrease in the absence of benefit increases and changes in actuarial assumptions.

Financial Objective Achievement Tests
Comparative Statement
($ amounts in thousands)

Valuation Date June 30	(1) Valuation Assets	(2) Member Payroll [(a)]	(3) AAL ^	(4) UAAL ^	Continuation Tests TEST 1 (1) / (3)	Continuation Tests TEST 2 (4) / (2)
1988	$ 28,235	$ 6,590	$ 36,351	$ 8,116	77.7 %	123.2 %
1989	31,981	7,298	39,387	7,406	81.2 %	101.5 %
1990#	35,694	7,727	42,480	6,786	84.0 %	87.8 %
1991	40,110		43,785	3,675	91.6 %	47.3 %
1992*	43,929	8,359	46,891	2,962	93.7 %	35.4 %
1993	49,549	8,563	48,691	(858)	101.8 %	+
1994@	54,518	8,357	53,344	(1,174)	102.2 %	+
1995#	59,906	9,104	60,373	467	99.2 %	5.1 %
1996	65,885	9,834	65,549	(336)	100.5 %	+
1997	72,134	10,039	70,033	(2,101)	103.0 %	+
1998	79,796	9,813	73,270	(6,526)	108.9 %	+
1999	87,618	9,750	76,230	(11,388)	114.9 %	+
2000	95,548	11,235	81,667	(13,881)	117.0 %	+
2001	101,191	11,615	85,536	(15,655)	118.3 %	+
2002*	103,951	11,908	92,955	(10,996)	111.8 %	+
2003#	103,656	11,885	97,858	(5,798)	105.9 %	+
2004	103,746	12,114	101,773	(1,973)	101.9 %	+
2005	102,756	12,085	107,850	5,094	95.3 %	42.2 %
2006	103,283	12,284	114,501	11,218	90.2 %	91.3 %
2007#	108,245	12,358	121,823	13,578	88.9 %	109.9 %
2008#	113,286	12,497	126,752	13,466	89.4 %	107.8 %
2009*	112,094	11,954	133,053	20,959	84.2 %	175.3 %
2010	112,804	12,383	137,557	24,753	82.0 %	199.9 %
2011	115,775	12,610	140,864	25,089	82.2 %	199.0 %
2012	115,083	12,270	145,541	30,458	79.1 %	248.2 %
2013	117,879	11,701	149,005	31,126	79.1 %	266.0 %
2014#	125,527	12,656	154,038	28,511	81.5 %	225.3 %
2015*	131,758	13,496	166,935	35,177	78.9 %	260.6 %
2016#	135,408	13,471	171,939	36,531	78.8 %	271.2 %
2017*#	140,243	14,216	184,652	44,409	76.0 %	312.4 %

* *After changes in actuarial assumptions or methods.*

\# *After changes in benefit provisions.*

(a) *From 1980 to 1986, total payroll for Retirement System purposes was projected to be 107% of reported payroll (base pay). This was done because of the inclusion of overtime and longevity pay in gross pay for Retirement System purposes.*

^ *Prior to the 6/30/2006 valuation, actuarial present value of credited projected benefits was used.*

\+ *Retirement System is fully funded on a credited projected benefit basis.*

@ *Assets shown are net of health assets beginning in 1994.*

Short Condition Test - Comparative Statement

The Short Condition Test is another way of looking at a system's progress under its funding program - based on the entry-age accrued liability. In a short condition test, the plan's valuation assets are compared with: 1) Active member contributions on deposit; 2) The liabilities for future benefits to present retired lives; and 3) The liabilities allocated to service already rendered by active members. In a system that has been following the discipline of level percent-of-payroll financing, the liabilities for active member contributions on deposit (liability 1) and the liabilities for future benefits to present retired lives (liability 2) will be fully covered by valuation assets (except in rare circumstances). In addition, the liabilities assigned to service already rendered by active members (liability 3) will be partially covered by the remainder of the valuation assets. The larger the funded portion of liability 3, the stronger the condition of the system. Liability 3 being fully funded is uncommon.

The following schedule illustrates the history of liabilities 1, 2 and 3.

Val. Date June 30	Actuarial Accrued Liability ^ (1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active & Inactive Members (Employer Financed)	Valuation Assets	Portion of Present Values Covered by Assets (1)	(2)	(3)
1998	$ 6,324,586	$41,008,304	$25,936,959	$ 79,796,431	100%	100%	125%
1999	6,530,277	45,233,238	24,466,454	87,617,793	100%	100%	147%
2000	7,100,050	46,324,310	24,242,251	95,548,441	100%	100%	149%
2001	7,271,115	49,610,467	28,654,887	101,190,705	100%	100%	155%
2002*	8,349,181	51,343,164	33,262,624	103,950,731	100%	100%	133%
2003#	8,560,912	54,767,310	34,529,455	103,655,770	100%	100%	117%
2004	9,281,501	56,062,967	36,428,766	103,745,735	100%	100%	105%
2005	9,474,647	62,017,507	36,357,438	102,755,663	100%	100%	86%
2006	10,309,119	62,976,517	38,560,107	103,283,413	100%	100%	78%
2007#	10,990,190	67,946,355	42,886,868	108,245,308	100%	100%	68%
2008#	11,173,085	71,090,277	44,488,843	113,285,618	100%	100%	70%
2009*	10,939,230	79,883,240	42,230,347	112,094,168	100%	100%	50%
2010	11,664,234	80,725,431	45,167,594	112,804,385	100%	100%	45%
2011	11,687,246	85,197,066	43,979,382	115,774,764	100%	100%	43%
2012	11,676,628	91,012,108	42,852,215	115,083,128	100%	100%	29%
2013	11,058,220	96,565,549	41,381,230	117,879,023	100%	100%	25%
2014#	11,386,585	98,326,146	44,325,246	125,526,809	100%	100%	36%
2015*	11,991,306	107,510,592	47,433,443	131,757,916	100%	100%	26%
2016#	12,869,644	106,715,647	52,353,595	135,407,676	100%	100%	30%
2017*#	13,607,875	110,428,262	60,616,061	140,243,417	100%	100%	27%

* *After changes in actuarial assumptions or methods.*
\# *After changes in benefit provisions.*
^ *Prior to the 6/30/2006 valuation, present value of credited projected benefits was used.*

Total Computed and Actual City Contributions
Comparative Statement

Fiscal Year	Valuation Date June 30	Actual Dollar Contribution @	Valuation Payroll (a)	City's Computed % of Payroll Contributions
1989/90	1988	$ 1,719,730	$ 6,590,380	26.08%
1990/91	1989	2,014,154	7,298,136	25.04%
1991/92	1990 #	1,990,000	7,727,204	24.35%
1992/93	1991	1,875,000	7,770,366	21.76%
1993/94	1992 *#	2,278,039	8,359,429	25.85%
1994/95	1993	2,141,014	8,562,961	23.30%
1995/96	1994	2,209,630	8,357,447	23.14%
1996/97	1995	2,447,857	9,103,643	25.09%
1997/98	1996	2,862,874	9,834,167	23.81%
1998/99	1997	2,188,572	10,039,322	21.80%
1999/00	1998	2,005,241	9,813,441	13.65%
2000/01	1999	1,590,027	9,749,682	12.68%
2001/02	2000	1,748,678	11,235,312	13.37%
2002/03	2001	1,571,015	11,615,098	12.12%
2003/04	2002 *	2,720,559	11,907,553	21.54%
2004/05	2003 #	2,922,144	11,885,130	23.70%
2005/06	2004	3,108,229	12,114,360	23.91%
2006/07	2005	3,540,775	12,085,192	26.28%
2007/08	2006 *	3,617,333	12,283,787	23.33%
2008/09	2007#	3,908,721	12,358,265	23.77%
2009/10	2008#	3,622,270	12,497,433	23.93%
2010/11	2009*	4,346,195	11,953,735	26.67%
2011/12	2010	4,159,617	12,383,339	27.85%
2012/13	2011	4,105,429	12,609,794	27.80%
2013/14	2012	4,316,203	12,269,834	30.12%
2014/15	2013	4,612,446	11,700,630	31.10%
2015/16	2014#	4,664,957	12,656,141	29.21%
2016/17	2015*	4,728,234	13,495,955	29.89%
2017/18	2016#	NA	13,470,636	31.01%
2018/19	2017*#	NA	14,216,474	33.36%

* *After changes in actuarial assumptions or methods.*

\# *After plan amendment.*

(a) *From 1980 to 1986, total valuation payroll was projected to be 107% of reported payroll (base pay). This was done because of the inclusion of overtime and longevity pay in gross pay for Retirement System purposes.*

@ *Includes post-retirement health care in 1993/1994 through 2015/2016.*

Development of Funding Value of Assets

Year Ended June 30	2015	2016	2017	2018	2019	2020	2021
A. Funding Value Beginning of Year	$125,526,809	$131,757,916	$ 135,407,676				
B. Market Value End of Year	133,850,434	132,048,993	138,509,336				
C. Market Value Beginning of Year	133,938,665	133,850,434	132,048,993				
D. Non-Investment Net Cash Flow	(4,621,092)	(4,201,988)	(4,914,524)				
E. Investment Income							
E1. Market Total: B - C - D	4,532,861	2,400,547	11,374,867				
E2. Assumed Rate of Investment Return	7.00%	6.75%	6.75%	6.50%			
E3. Amount for Immediate Recognition	8,625,138	8,751,842	8,974,153				
E4. Amount for Phased-In Recognition: E1-E3	(4,092,277)	(6,351,295)	2,400,714				
F. Phased-In Recognition of Investment Income							
F1. Current Year: 0.20 x E4	$(818,455)	$(1,270,259)	480,143				
F2. First Prior Year	1,793,038	(818,455)	(1,270,259)	$ 480,143			
F3. Second Prior Year	591,643	1,793,038	(818,455)	(1,270,259)	$ 480,143		
F4. Third Prior Year	(1,196,059)	591,643	1,793,038	(818,455)	(1,270,259)	$ 480,143	
F5. Fourth Prior Year	1,856,894	(1,196,061)	591,645	1,793,037	(818,457)	(1,270,259)	$ 480,142
F6. Total Recognized Investment Gain	$2,227,061	$ (900,094)	$ 776,112	$ 184,466	$ (1,608,573)	$ (790,116)	$ 480,142
G. Funding Value End of Year:							
G1. Preliminary Funding Value End of Year: A+D+E3+F6	131,757,916	135,407,676	140,243,417				
G2. Upper Corridor Limit: 120% x B	160,620,521	158,458,792	166,211,203				
G3. Lower Corridor Limit: 80% x B	107,080,347	105,639,194	110,807,469				
G4. Funding Value End of Year	**$131,757,916**	**$135,407,676**	**$ 140,243,417**				
H. Difference between Market & Funding Value: B-G4	2,092,518	(3,358,683)	(1,734,081)				
I. Recognized Rate of Return	8.81%	6.06%	7.33%				
J. Market Rate of Return	3.44%	1.82%	8.78%				

The Funding Value of Assets recognizes assumed investment income (line E2) fully each year. Differences between actual and assumed investment income (line E3) 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.

Actuarial Balance Sheet - June 30

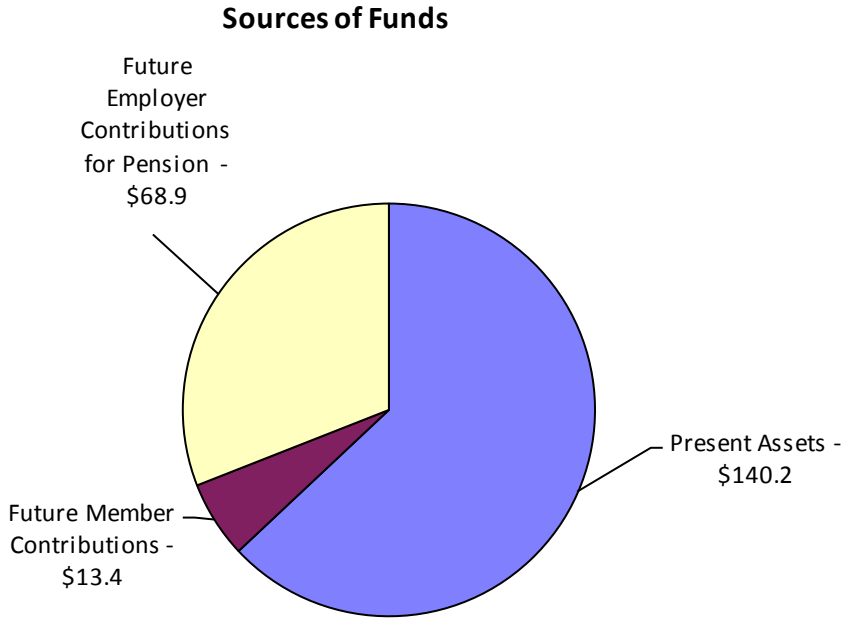
Present Resources and Expected Future Resources

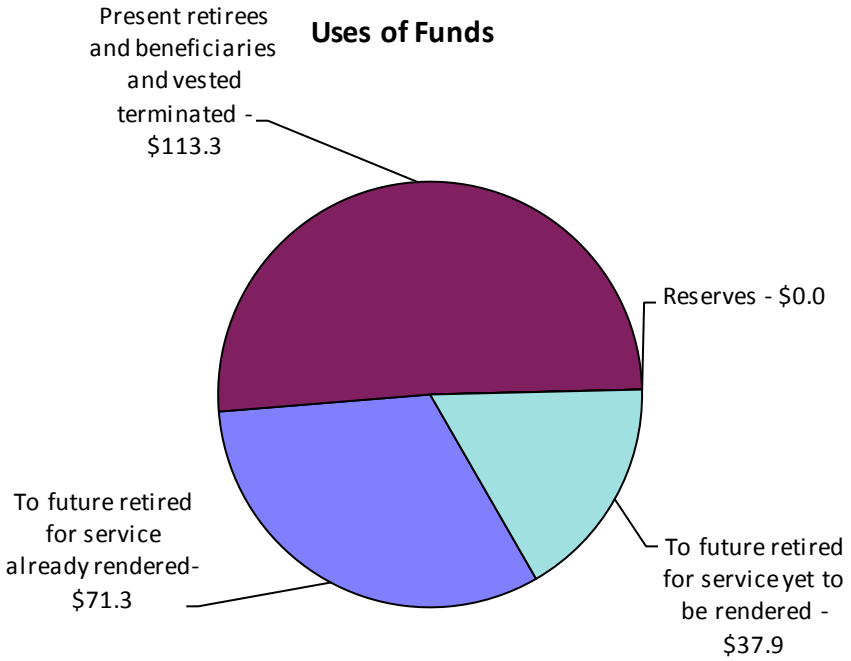
	2017	2016
A. Valuation assets		
1. Net assets from System financial statements (market value)	$138,509,336	$132,048,993
2. Valuation adjustment	1,734,081	3,358,683
3. Valuation assets	140,243,417	135,407,676
B. Actuarial present value of expected future employer contributions		
1. For normal costs	24,486,032	23,219,104
2. For unfunded actuarial accrued liabilities	44,408,781	36,531,210
3. Total	68,894,813	59,750,314
C. Actuarial present value of expected future member contributions	13,432,743	10,885,053
D. Reserves	0	0
E. Total Actuarial Present Value of Present and Expected Future Resources	$222,570,973	$206,043,043

Actuarial Present Value of Expected Future Benefit Payments and Reserves

A. To retirees and beneficiaries	$ 110,428,262	$ 106,715,647
B. To terminated members	2,884,604	2,588,562
C. To present active members		
1. Allocated to service rendered prior to valuation date	71,339,332	62,634,677
2. Allocated to service likely to be rendered after valuation date	37,918,775	34,104,157
3. Total	109,258,107	96,738,834
D. Total Actuarial Present Value of Expected Future Pension Payments	222,570,973	206,043,043
E. Reserves		
1. Allocated to retirees and beneficiaries	0	0
2. Post-Retirement Health Care	0	0
3. Total	0	0
F. Total Actuarial Present Value of Expected Future Benefit Payments and Reserves	$222,570,973	$206,043,043

Financing $222.6 Million of Benefit Promises
JUNE 30, 2017





Derivation of Actuarial Gain (Loss)
Year Ended June 30

The actuarial gains or losses realized in the operation of the Retirement System provide an experience test. Gains and losses are expected to cancel each other over a period of years (in the absence of double-digit inflation) and sizable year-to-year fluctuations are common. Details of the derivation of the actuarial gain (loss) are shown below, along with a year-by-year comparative schedule.

	2017	2016
(1) UAAL* at start of year	$ 36,531,210	$ 35,177,425
(2) Employer normal cost	2,365,444	2,291,613
(3) Actual employer contributions	4,228,234	4,164,957
(4) Interest accrual	2,402,988	2,311,251
(5) Expected UAAL before changes: (1) + (2) - (3) + (4)	37,071,408	35,615,332
(6) Changes due to plan amendments	1,322,624	954,398
(7) Changes due to revised assumptions or methods	4,645,879	0
(8) Expected UAAL after changes	43,039,911	36,569,730
(9) Actual UAAL at end of year	44,408,781	36,531,210
(10) Gain (loss): (8) - (9)	(1,368,870)	38,520
(11) Gain (loss) as a percent of actuarial accrued liabilities at start of year ($171,938,886)	(0.8%)	0.0%

* *Unfunded actuarial accrued liability.*

Valuation Date June 30	Actuarial Gain (Loss) as % of Beginning Accrued Liabilities
2008	0.1 %
2009	(4.7)%
2010	(2.4)%
2011	(0.1)%
2012	(3.5)%
2013	0.1 %
2014	2.0 %
2015	0.6 %
2016	0.0 %
2017	(0.8)%

Comments, Recommendations and Conclusions

Experience: Investment experience on a market value basis for the year ended June 30, 2017 was favorable with a market rate of return of 8.78% (versus the expected return of 6.75%). On a funding value basis, investment gains as of June 30, 2017 totaled $776.1 thousand. Overall experience from 2016-2017 was lower than expected.

Expected Computed Contribution Rates in Future Years: The method used to derive valuation assets will, over the long-term, produce rates of return equal to those measured on a pure market value basis. This means that over the long term, total employer contributions are not expected to be impacted by the method used to derive valuation assets. This relationship does not hold over the short term; valuation assets may drop to 80% of market value or go up to 120% of market value. Valuation assets are now approximately $1.7 million higher than the market value with $1.7 million of investment losses still to be recognized. Recognition of these losses over the next several years is expected to put upward pressure on employer contribution rates.

Post-Retirement Health Care Benefit: Contributions made to the retiree health portion of the fund must meet certain requirements specified in IRC 401(h). Page A-14 of this report provides information regarding the required subordination test.

Please note the following:

- Even if contributions equal to the limit are made, they would not be expected to be sufficient to meet the ongoing post-retirement health care costs.
- As long as post-retirement health care payments made from the Retirement System do not exceed the Reserve for Health Care balance, the decision to either levy any money or make any contributions to cover post-retirement health care through the Retirement System remains a policy decision.

Comments, Recommendations and Conclusions

Amortization Method: The current method for amortizing Unfunded Actuarial Accrued Liability (UAAL) is a level percent of pay approach over a closed period of 30 years beginning July 1, 2015 and ending June 30, 2045 (27 years remaining as of the June 30, 2017 valuation, which determines the fiscal year 2019 contribution). Benefit changes and assumption changes are separately amortized over 30 years as they occur. Absent actuarial gains or losses, a closed amortization period is expected to result in UAAL amortization payments that remain level as a percentage of payroll.

Benefit Changes: The following new benefit provisions were reported for this valuation:

- Member Contribution Rate for Fire IAFF: 11.04% as of 7/1/17
- Fire IAFF: 3 Years in Final Average Compensation effective 7/1/17
- Fire IAFF: Deferred Retirement Option Plan (DROP) adopted and effective 7/1/16

These provisions are reflected for the first time in the June 30, 2017 valuation.

Valuation Assumptions: The following valuation assumptions were adopted by the Board for the June 30, 2017 valuation:

- 6.50% rate of return (decreased from 6.75%)
- 4.00% wage inflation (decreased from 4.25%)
- Fire IAFF: Rates of retirement were adjusted in conjunction with the DROP in anticipation of extended career lengths.

We expect to review economic assumptions again in late spring and report to the Board.

Conclusion: The Retirement System's financial objective is to meet long-term benefit obligations through contributions that remain approximately level from year to year as a percent of active member payroll. Continued receipt of these contributions is the best guarantee that the Plan will be able to pay all promised benefits when due.

IRC 401(h) Compliance Test

Valuation Year	Fiscal Year	(1) Estimated Payroll	(2) PUCNC Pension	(3) Actual $ Pension	(4) Total Actual PUCNC	(5) Health Contribution	(6) Sum of (4)+(5)	(7) Sum of All Years in (5)	(8) Sum of All Years in (6)	(9) Percentage Health/Total (7)/(8)
6/08	08/09	$12,427,849	28.51%	$3,927,200	$3,542,703	500,000	$4,042,703	$14,695,387	$64,325,899	22.8%
6/09	09/10	12,225,584	28.84%	4,126,440	3,526,273	506,000	4,032,273	15,201,387	68,358,172	22.2%
6/10	10/11	12,658,898	28.33%	4,877,174	3,586,153	500,000	4,086,153	15,701,387	72,444,325	21.7%
6/11	11/12	12,439,814	28.22%	4,581,734	3,510,345	500,000	4,010,345	16,201,387	76,454,670	21.2%
6/12	12/13	11,985,232	28.00%	4,637,167	3,356,361	512,795	3,869,156	16,714,182	80,323,826	20.8%
6/13	13/14	12,178,386	28.41%	4,787,871	3,460,149	512,795	3,972,944	17,226,977	84,296,770	20.4%
6/14	14/15	13,076,048	28.43%	4,760,687	3,718,152	1,018,000	4,736,152	18,244,977	89,032,922	20.5%
6/15	15/16	13,483,296	27.60%	5,242,590	3,720,972	500,000	4,220,972	18,744,977	93,253,894	20.1%
6/16	16/15	13,843,555	29.17%	5,461,382	4,038,054	500,000	4,538,054	19,244,977	97,791,948	19.7%

SECTION B

SUMMARY OF BENEFIT PROVISIONS AND VALUATION DATA

Brief Summary of Act 345 Benefit Conditions Evaluated (Updated to JUNE 30, 2017)

ELIGIBILITY	AMOUNT

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-2.

DEFERRED RETIREMENT

Termination of employment after 10 or more years of service.	Computed as service retirement but based upon service, Average Final Compensation (AFC) and benefit in effect at termination. Benefit begins at date retirement would have occurred had member remained in employment.

DEATH AFTER RETIREMENT SURVIVOR'S PENSION

Payable to a surviving spouse, if any, upon the death of a retired member who was receiving a straight life pension which was effective July 1, 1975 or later.	Spouse's pension equals 60% of the straight life pension the deceased retiree was receiving.

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

Payable to a surviving spouse, if any, upon the death of a member with 20 or more years of service, or a Police member with 10 or more years of service.	Accrued straight life pension actuarially reduced in accordance with an Option I election.

DUTY DEATH-IN-SERVICE SURVIVOR'S PENSION

Payable upon the expiration of Worker's Compensation to the survivors of a member who died in the line of duty.	Same amount that was paid by Worker's Compensation.

NON-DUTY DISABILITY

Payable upon the total and permanent disability of a member with 5 or more years-of-service.	To age 55: 1.5% of AFC times years of service. At age 55: Same as Service Retirement Pension.

DUTY DISABILITY

Payable upon the total and permanent disability of a member in the line of duty.	To age 55: 50% of AFC. At age 55: Same as Service Retirement Pension with service credit from date of disability to age 55.

MEMBER CONTRIBUTIONS

Amounts are described on page B-2.

Summary of Benefit Provisions
as of JUNE 30, 2017

Group	No. People	GRS Code	Eligibility	Benefit Multiplier*	Maximum Benefit	Years In FAC	Member Contribution Rate
Police:							
Sergeants - POLC	15	91	25 yrs. of service or age 60	3.0%/1.0%	80% of FAC	3	11.72%
Lieutenants	5	90	25 yrs. of service or age 60	3.0%/1.0%	80% of FAC	3	10.00%
POLC	83	92	25 yrs. of service or age 60	3.0%/1.0%	80% of FAC	5	8.25%
Non-Represented	6	95,97	25 yrs. of service or age 60	3.0%/1.0%	80% of FAC	3	10.00%
Fire:							
OSP	4	94	age 50 and 25 yrs. or age 60	3.0%/1.0%	80% of FAC	3	10.00%
IAFF	75	93	25 yrs. of service or age 60	3.0%/1.0%	80% of FAC	3	11.04%
Non-Represented	1	98	25 yrs. of service or age 60	3.0%/1.0%	80% of FAC	3	10.00%
Total	**189**						

* *First multiplier applies to the first 25 years of service. Second multiplier applies to service greater than 25 years.*

Note: None of the above groups are covered by Social Security.
For IAFF, employee contributions are made on a pre-tax basis.

Summary of Benefit Provisions
as of JUNE 30, 2017

DEFERRED RETIREMENT OPTION PLAN (DROP)

Effective July 1, 2016, Firefighter IAFF members with credited service between 25 and 30 years may participate in the Deferred Retirement Option Plan for a maximum participation period of five years. The benefit amount is the participant's accrued benefit at the date of DROP election. DROP benefits are credited monthly and DROP interest is credited quarterly to a DROP account at the rate of 2% annually. Employer and employee contributions will continue while the member participates in the DROP. Employer and employee contributions are not deposited in the DROP account. Upon actual retirement, the participant may elect a lump sum distribution of the DROP Account or direct rollover to a qualified plan.

Sample Benefit Computation

Assumed data in connection with this sample retirement is shown below:

	Data	Description
A.	$40,000	Final Average Compensation
B.	27	Years of Credited Service
C.	50	Age of Retiree
D.	60%	Percentage to continue to spouse after retiree's death (this is automatic)

	Sample Computation Steps		Annual Amount
E.	Benefit Formula:	0.03 x 25 x $40,000 =	$30,000
		+0.01 x 2 x $40,000 =	800
			30,800
F.	Maximum Benefit:	0.80 x $40,000 =	$32,000
	Benefit payable to:		
G.	Retiree while spouse is alive (lesser of E and F)		$30,800
H.	Spouse after retiree's death (D x G)		18,480
I.	Retiree after spouse's death		$30,800

Allocation of Employer Assets between Pension and Health

	Pension	Health	Total
1) Market Value of Assets 6/30/16	**$132,048,993**	**$ 0**	**$132,048,993**
2) Employer Contrib. ($) FY 16/17	4,228,234	500,000	4,728,234
3) Employee Contrib. ($) FY 16/17	1,233,148	0	1,233,148
4) Benefits Paid and Refunds FY 16/17	10,375,906	500,000	10,875,906
5) Net Cash Flow FY 16/17: (2)+(3)-(4)	(4,914,524)	0	(4,914,524)
6) Investment Income FY 16/17 (Market Value)	11,374,867	0	11,374,867
7) Market Value of Assets 6/30/17: (1)+(2)+(3)-(4)+(6)	**$138,509,336**	**$ 0**	**$138,509,336**

Reported Fund Balance

Reserves for	Reported Market Values June 30	
	2017	2016
Employees' Contributions	$ 28,816,789	$ 28,413,261
Employer Contributions	(5,026,593)	(8,272,114)
Retired Benefit Payments	114,719,140	111,907,846
Post-Retirement Health Care	0	0
Total Fund Balance	$138,509,336	$132,048,993

Valuation assets are equal to the funding value of assets derived on page A-8.

In financing actuarial accrued liabilities, valuation assets of $140,243,417 were distributed as follows:

Reserves for	Valuation Assets Applied to Actuarial Accrued Liabilities for			Totals
	Active Members	Retirees & Beneficiaries	Health Care Reserve	
Employees' Contributions	$28,816,789			$ 28,816,789
Employer Contributions	(735,715)	$ (4,290,878)		(5,026,593)
Retired Benefit Payments		114,719,140		114,719,140
Health Care			$0	0
Market Value Adjustment	1,734,081			1,734,081
Total Funding Value	$29,815,155	$110,428,262	$0	$140,243,417

Summary of Current Asset Information Reported for Valuation

Assets (Market Value)

	June 30	
	2017	2016
Cash & equivalents	$ 4,773,866	$ 8,386,875
Other short-term investments	0	0
Fixed income	61,347,832	61,780,668
Stocks	72,327,008	62,460,380
Real estate investments	673,773	624,514
Accounts receivable	(613,143)	(1,203,444)
Total Assets	$138,509,336	$132,048,993

Revenues and Expenses

	2016-17	2015-16
Balance - July 1	$132,048,993	$133,850,434
Revenues		
Employees' contributions	1,233,148	1,077,633
Employer contributions	4,728,234	4,664,957
Net Investment income	11,564,650	2,617,276
Expenses		
Benefit payments	10,355,887	9,441,511
Refunds of member contributions	20,019	3,067
Administrative expenses	189,782	216,729
Health insurance premiums	500,000	500,000
Rounding Adjustment	0	0
Balance - June 30	$138,509,337	$132,048,993

Asset Information Reported for Valuation
Comparative Statement

Year Ended June 30	Assets Beginning of Year	Revenues				Expenses			Assets Year-End
		Employee Contrib.	Employer Contrib.	Investment Income	Misc. Income	Retirement Benefits	Contribs. Refunds	Misc.(*) Expenses	
1993	$ 46,232,952	$ 564,523	$1,875,000	$ 6,163,269	$0	$ 1,516,348	$ 42,244	$ 375,546	$ 52,901,606
1994	52,901,606	652,166	2,278,039	5,124,539	0	1,967,395	35,812	850,623	58,102,520
1995	58,102,520	664,170	2,141,014	5,142,121	0	2,321,947	1,404	1,152,671	62,573,803
1996	62,573,803	758,715	2,209,630	5,867,205	0	2,679,317	22,840	541,958	68,165,238
1997	68,165,238	815,487	2,447,587	8,245,891	0	3,193,357	37,540	985,759	75,457,547
1998	78,893,397	782,573	2,862,874	16,532,678	0	3,569,152	96,598	1,516,407	93,889,365
1999	93,889,365	857,090	2,188,572	7,562,429	0	4,245,423	153,751	1,193,442	98,904,840
2000	98,904,840	860,852	2,005,241	10,074,744	0	4,206,891	112,149	1,327,756	106,198,881
2001	106,198,881	946,812	1,590,027	-508,876	0	4,411,998	168,781	1,691,962	101,954,103
2002	101,954,103	924,388	1,748,678	(5,364,998)	0	4,556,200	34,664	1,734,654	92,936,653
2003	92,936,653	964,525	1,571,015	3,196,673	0	4,785,350	46,812	1,991,658	91,845,046
2004	91,845,046	999,306	2,720,559	8,470,556	0	4,990,364	141,260	2,320,746	96,583,097
2005	96,583,097	1,001,337	2,922,144	4,944,462	0	5,473,699	41,859	2,129,549	97,805,933
2006	97,805,933	960,556	3,108,229	8,955,746	0	6,166,401	105,665	2,375,321	102,183,077
2007	102,183,077	943,869	3,540,775	13,563,262	0	5,976,094	111,456	1,733,295	112,410,138
2008	112,410,138	1,057,662	3,617,333	-1,099,790	0	6,035,431	130,761	792,349	109,026,802
2009	109,026,802	1,076,661	3,908,721	(12,529,495)	0	6,849,499	74,325	1,147,058	93,411,807
2010	93,411,807	1,010,170	3,622,270	11,782,723	0	7,290,810	107,078	1,277,732	101,151,350
2011	101,151,350	1,030,979	4,346,195	17,754,126	0	7,581,972	13,464	1,168,496	115,518,718
2012	115,518,718	922,117	4,159,617	2,600,092	0	8,669,455	110,630	1,123,098	113,297,361
2013	113,297,361	1,044,533	4,105,429	11,514,896	0	7,735,131	75,382	1,124,722	121,026,984
2014	121,026,984	984,463	4,316,203	17,738,393	0	8,899,974	47,356	1,180,048	133,938,665
2015	133,938,665	1,166,241	4,612,446	5,204,344	0	9,358,827	22,952	1,689,483	133,850,434
2016	133,850,434	1,077,633	4,664,957	2,617,276	0	9,441,511	3,067	716,729	132,048,993
2017	132,048,993	1,233,148	4,728,234	11,564,650	0	10,355,887	20,019	689,782	138,509,337

(*) Misc. expenses include investment expenses and health insurance premiums for retired lives paid after 8/1/1980.

Retirees and Beneficiaries Added to and Removed from Rolls
Comparative Statement

Year Ended June 30	Added to Rolls (Includes Benefit Adjustments)		Removed from Rolls		Rolls End of Year		% Incr. Annual Benefits	Average Annual Benefit	Present Value of Benefits	Expected Removals
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits				
1988	22	$ 526,036	2	$ 12,896	107	$ 1,371,342	59.8 %	$ 12,816	$ 15,913,118	2.7
1989	5	86,432	5	46,863	107	1,410,911	2.9 %	13,186	16,192,243	3.0
1990#	4	132,412	2	6,821	109	1,536,502	8.9 %	14,096	17,080,913	3.1
1991	3	17,165	3	28,608	109	1,525,059	(0.7)%	13,991	16,615,266	3.4
1992	3	35,744	4	40,257	108	1,520,546	(0.3)%	14,163	15,355,839	3.6
1993	4	102,957	1	7,200	111	1,616,303	6.3 %	14,561	16,316,103	3.5
1994	20	592,886	5	41,062	126	2,168,127	34.1 %	17,207	23,000,034	3.8
1995#	11	313,427	2	15,728	135	2,465,826	13.7 %	18,265	26,363,115	3.9
1996@	9	452,213			144	2,918,042	18.3 %	20,264	31,375,781	4.3
1997	15	564,090	5	42,709	154	3,439,423	17.9 %	22,334	37,399,338	4.6
1998	11	370,753	1	11,172	164	3,799,004	10.5 %	23,165	41,008,304	5.1
1999	15	459,424	8	114,372	171	4,144,056	9.1 %	24,234	45,233,238	5.2
2000	12	274,422	7	129,923	176	4,288,555	3.5 %	24,367	46,324,310	5.6
2001	16	424,378	8	134,929	184	4,578,004	6.7 %	24,880	49,610,467	5.6
2002	6	123,085	3	41,718	187	4,659,371	1.8 %	24,916	51,343,164	5.1
2003	9	352,598	3	41,567	193	4,970,403	6.7 %	25,753	54,767,310	5.3
2004	5	197,292	5	55,272	193	5,112,423	2.9 %	26,489	56,062,967	5.3
2005	12	558,890	3	39,781	202	5,631,532	10.2 %	27,879	62,017,507	5.3
2006	4	168,387	2	15,692	204	5,784,227	2.7 %	28,354	62,976,517	5.7
2007#@	8	641,673	4	70,472	208	6,355,428	9.9 %	30,555	67,946,355	6.0
2008#	9	395,393	6	96,022	211	6,654,800	4.7 %	31,539	71,090,277	6.5
2009#	17	747,839	5	95,118	223	7,307,521	9.8 %	32,769	79,883,240	6.5
2010	11	283,961	8	145,046	226	7,446,436	1.9 %	32,949	80,725,431	5.9
2011	12	508,150	5	75,940	233	7,878,646	5.8 %	33,814	85,197,066	6.1
2012	13	647,101	7	148,315	239	8,377,432	6.3 %	35,052	91,012,108	6.4
2013	14	651,987	5	99,636	248	8,929,783	6.6 %	36,007	96,565,549	6.2
2014	6	319,868	3	79,524	251	9,170,127	2.7 %	36,534	98,326,146	6.7
2015#	9	418,887	8	148,950	252	9,440,064	2.9 %	37,461	107,510,592	7.0
2016#	9	241,162	11	235,038	250	9,446,188	0.1 %	37,785	106,715,647	5.5
2017#	8	355,784	10	270,124	248	9,531,848	0.9 %	38,435	110,428,262	5.4

 # After plan amendment and/or changes to actuarial assumptions.

@ Includes correction to data in between valuations (removal of two retirees who had died).

Retirees and Beneficiaries by Type of Benefits Being Paid

Type of Benefit Being Paid	No.	Annual Benefits Being Paid	Average Annual Benefit
Age and Service Benefits			
Straight life benefit - benefit terminating at death of retirant	43	$1,421,071	$33,048
Automatic 60% survivor benefit to spouse	163	7,316,761	44,888
Option 1 benefit - 100% joint and survivor			
Option 2 benefit - 50% joint and survivor	1	14,400	14,400
Benefit being paid survivor beneficiary of deceased retiree	31	555,812	17,929
Total age and service benefits	238	9,308,044	39,109
Casualty Benefits			
Duty disability benefits	4	111,283	27,821
Non-duty disability benefits	2	23,290	11,645
Duty death benefits	1	34,546	34,546
Non-duty death benefits	3	54,685	18,228
Total casualty benefits	10	223,804	22,380
Total Benefits Being Paid	**248**	**$9,531,848**	**$38,435**

Retirees and Beneficiaries as of June 30, 2017
Tabulated by Attained Ages

Attained Ages	Age & Service Retirees		Disability Retirees		Survivor Beneficiaries	
	No.	Annual Benefits	No.	Annual Benefits	No.	Annual Benefits
30-34			1	$ 28,773		
40-44			1	12,348		
45-49	6	$ 301,198				
50-54	18	1,107,316	1	10,942	2	$ 64,655
55-59	27	1,457,278			1	36,478
60-64	45	1,958,431			1	25,821
65-69	45	1,921,024	2	73,870	7	150,496
70-74	38	1,294,121			4	87,570
75-79	14	420,995			6	106,725
80-84	3	69,555	1	8,640	8	97,540
85-89	8	170,638			2	40,675
90-94	3	51,675			4	35,084
Totals	**207**	**$8,752,231**	**6**	**$134,573**	**35**	**$645,044**

Active Members in the DROP as of June 30, 2017

Valuation Divisions	No.	Annual Retirement Benefits	DROP Account Balances	Average Age	
				At DROP	Current
IAFF	1	$ 53,348	$ 21,903	48.5 yrs.	49.0 yrs.

Active Members as of June 30, 2017
Tabulated by Valuation Divisions

Valuation Division	No.	Annual Payroll	Average in Years		Average Pay
			Age	Service	
Police:					
Lieutenants	5	$ 524,439	48.2	21.7	$104,888
Sergeants (POLC)	15	1,470,174	45.3	19.5	98,012
Other POLC	83	5,899,360	38.3	10.5	71,077
Non-Represented	6	540,202	47.9	21.7	90,034
Fire:					
OSP	4	418,712	44.0	17.7	104,678
IAFF*	75	5,256,596	43.0	13.5	70,088
Non-Represented	1	106,991	46.4	14.5	106,991
Totals	**189**	**$14,216,474**	**41.4**	**13.2**	**$75,219**

* *Includes 1 DROP member with payroll of $63,939*

Additions to and Removals from Active Membership
Actual and Expected Numbers
Ten-Year Historical Schedule

Year Ended June 30	Number Added		Normal Retirement		Disability Retirement		Died-In-Service		Terminations		Members End of Year
	A	E	A	E	A	E	A	E	A	E	
2008	7	11	8	5.9	0	0.5	0	0.3	3	6.4	197
2009	10	19	14	8.2	1	0.5	0	0.3	4	4.1	188
2010	9	7	5	7.0	0	0.4	0	0.1	2	3.4	190
2011	13	10	7	7.0	0	0.5	0	0.1	3	3.2	193
2012	5	14	10	5.8	0	0.5	0	0.1	4	3.4	184
2013	13	20	10	7.5	0	0.5	1	0.1	9	3.1	177
2014	13	7	4	4.3	0	0.5	0	0.1	3	3.1	183
2015	13	8	4	2.7	1	0.5	0	0.1	3	3.3	188
2016	5	5	2	2.8	1	0.4	0	0.1	2	3.3	188
2017	9	8	4	4.0	0	0.4	0	0.1	4	3.2	189
10-Year Totals	97	109	68	55.2	3	4.7	1	1.4	37	36.5	

A represents actual number.
E represents expected number based on assumptions outlined in Section D.

Final Average Compensation for New Retirees With and Without Lump Sums (Comparative Schedule)

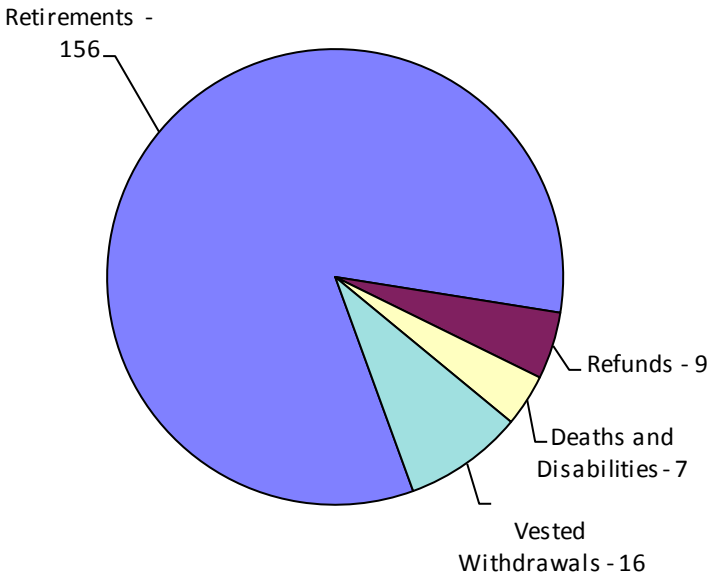
Year Ending June 30	Final Average Compensation		
	With	Without	Ratio
2008	$527,092	$515,740	1.02
2009	949,181	921,620	1.03
2010	409,874	369,887	1.11
2011	651,000	618,403	1.05
2012	812,029	648,518	1.25
2013	839,306	779,471	1.08
2014	382,165	323,231	1.18
2015	498,461	466,597	1.07
2016	224,046	206,720	1.08
2017	434,145	414,065	1.05
10-Year Average	$572,730	$526,425	1.09

Active Members Included in Valuation
Comparative Statement

Valuation Date June 30	Active Members	Vested Term. Members	Reported Payroll*	Average			% Increase
				Age	Service	Pay	
1983	203	0	$ 5,078,781	38.2	13.0	$25,019	8.3 %
1984	213	0	5,410,717	37.7	11.8	25,402	1.5 %
1985	214	2	5,534,747	38.1	12.2	25,863	1.8 %
1986	218	4	5,902,284	38.5	12.6	27,075	4.7 %
1987	218	4	6,713,148	38.6	12.7	30,794	13.7 %
1988	205	6	6,590,380	37.5	11.4	32,148	4.4 %
1989	208	5	7,298,136	38.1	11.8	35,087	9.1 %
1990	208	5	7,727,204	38.7	12.4	37,150	5.9 %
1991	212	6	7,770,366	39.2	13.0	36,653	(1.3)%
1992	217	6	8,359,429	39.7	13.4	38,523	5.1 %
1993	221	6	8,562,961	40.0	13.8	38,746	0.6 %
1994	206	6	8,357,447	39.8	13.5	40,570	4.7 %
1995	213	6	9,103,643	39.3	12.8	42,740	5.3 %
1996	229	6	9,834,167	38.6	11.6	42,944	0.5 %
1997	225	7	10,039,322	38.2	11.0	44,619	3.9 %
1998	216	6	9,813,441	38.3	11.2	45,433	1.8 %
1999	218	7	9,749,682	38.0	10.7	44,723	(1.6)%
2000	220	6	11,235,312	38.3	10.8	51,070	14.2 %
2001	215	7	11,615,098	38.2	10.8	54,024	5.8 %
2002	218	5	11,907,553	38.7	11.3	54,622	1.1 %
2003	207	5	11,885,130	39.3	12.0	57,416	5.1 %
2004	209	5	12,114,360	39.6	12.3	57,963	1.0 %
2005	199	5	12,085,192	39.9	12.5	60,730	4.8 %
2006	201	5	12,283,787	40.3	13.0	61,113	0.6 %
2007	201	5	12,358,265	40.7	13.3	61,484	0.6 %
2008	197	4	12,497,433	40.8	13.5	63,439	3.2 %
2009	188	5	11,953,735	40.3	13.0	63,584	0.2 %
2010	190	5	12,383,339	40.6	13.2	65,175	2.5 %
2011	193	5	12,609,794	40.7	13.0	65,336	0.2 %
2012	184	6	12,269,834	41.0	13.0	66,684	2.1 %
2013	177	9	11,700,630	40.2	12.6	66,105	(0.9)%
2014	183	11	12,656,141	40.2	12.3	69,159	4.6 %
2015	188	9	13,495,955	40.3	12.3	71,787	3.8 %
2016	188	9	13,470,636	41.0	12.9	71,652	(0.2)%
2017	189	9	14,216,474	41.4	13.2	75,219	5.0 %

* *Reported payroll. Beginning in 1980, payroll was projected by a factor of 1.07 to approximate the relationship between gross payroll and the reported base payroll. Beginning in 1987, gross payroll was reported and no projection was necessary.*

Active Members as of JUNE 30, 2017
Expected Terminations by Type in Future Years



This chart shows the expected future development of the present population in simplified terms. The Retirement System presently covers 188 active members. 91% of the present population is expected to receive monthly retirement benefits either by retiring directly from active service, or by retiring from vested deferred status. 4% of the present population is expected to die or become disabled and receive a benefit. 5% of the present population is expected to terminate employment and forfeit eligibility for an employer provided benefit.

Active Members as of JUNE 30, 2017
by Attained 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	2							2	$ 93,993
25-29	17	1						18	1,085,137
30-34	18	8	2					28	1,723,211
35-39	5	10	11	5				31	2,226,996
40-44	4	7	5	17	5			38	3,083,907
45-49	1	2	2	6	25	3		39	3,325,552
50-54		1		3	11	1		16	1,333,894
55-59		1		1	11			13	1,039,325
60					2			2	141,300
61				1				1	69,412
Totals	**47**	**30**	**20**	**34**	**54**	**4**		**189**	**$14,216,474**

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

Age:	41.4 years
Service:	13.2 years
Annual Pay:	$75,219

SECTION C

FINANCIAL PRINCIPLES, ACTUARIAL VALUATION PROCESS, ACTUARIAL COST METHODS, ACTUARIAL ASSUMPTIONS AND DEFINITIONS OF TECHNICAL TERMS

Basic Financial Principles and Operation of the Retirement System

Benefit Promises Made Which Must Be Paid For. A retirement program is an orderly means of handing out, keeping track of, and financing pension promises to a group of employees. As each member of the retirement program acquires a unit of service credit the member is, in effect, handed an "IOU" which reads: "The Retirement System promises to pay you one unit of retirement benefits, payments in cash commencing when you retire."

The principal related financial question is: When shall the money required to cover the "IOU" be contributed? This year, when the benefit of the member's service is received? Or, some future year when the "IOU" becomes a cash demand?

The Constitution of the State of Michigan is directed to the question:

> "Financial benefits arising on account of service rendered in each fiscal year shall be funded during that year and such funding shall not be used for financing unfunded accrued liabilities."

This Retirement System meets this requirement by having as its financial objective the establishment and receipt of 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 taxpayers.

Translated into actuarial terminology, a level percent-of-payroll contribution objective means that the contribution rate must be at least:

> Normal Cost (the present value of future benefits assigned to members' service being rendered in the current year)
>
> . . . plus . . .
>
> Interest on the Unfunded Actuarial Accrued Liability (the difference between the actuarial accrued liability and current System assets).

The accumulation of invested assets is a by-product of level percent-of-payroll contributions, not the objective. Investment income becomes the third major contributor to the retirement program, and the amount is directly reacted to the amount of contributions and investment performance.

If contributions to the retirement program are less than the preceding amount, the difference, plus investment earnings not realized thereon, will have to be contributed at some later time, or, benefits will have to be reduced, to satisfy the fundamental fiscal equation under which all retirement programs must operate:

B = C + I - E

The aggregate amount of Benefit payments to any group of members and their beneficiaries cannot exceed the sum of:

The aggregate amount of Contributions received on behalf of the group

. . . plus . . .

Investment earnings on contributions received and not required for immediate cash payments of benefits

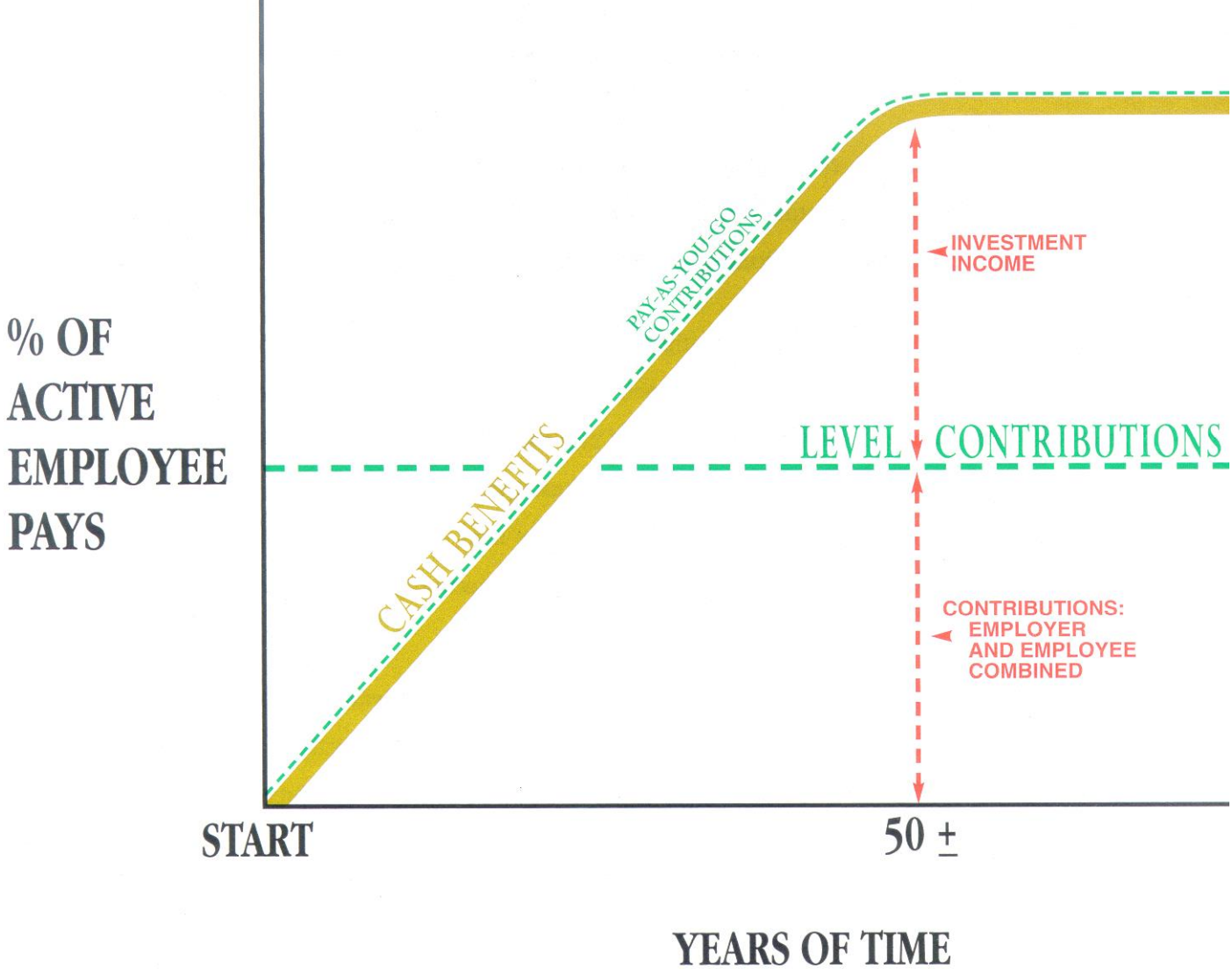
. . . minus . . .

The Expenses of operating the program.

There are retirement programs designed to defer the bulk of contributions far into the future. The present contribution rate for such systems is ***artificially low***. The fact that the contribution rate is destined to increase relentlessly to a much higher level, is often ignored.

This method of financing is prohibited in Michigan by the state constitution.

Computed Contribution Rate Needed To Finance Benefits. From a given schedule of benefits and from the data furnished, the actuary calculates the contribution rate ***by means of an actuarial valuation*** - the technique of assigning monetary values to the risks assumed in operating a retirement program.



CASH BENEFITS LINE. This relentlessly increasing line is the fundamental reality of retirement plan financing. It happens each time a new benefit is added for future retirements (and happens regardless of the design for contributing for benefits).

LEVEL CONTRIBUTION LINE. Determining the level contribution line requires detailed assumptions concerning a variety of experiences in future decades, including:

- Economic Risk Areas
  - Rates of investment return
  - Rates of pay increase
  - Changes in active member group size
- Non-Economic Risk Areas
  - Ages at actual retirement
  - Rates of mortality
  - Rates of withdrawal of active members (turnover)
  - Rates of disability

The Actuarial Valuation Process

The financing diagram on the previous page shows the relationship between the two fundamentally different philosophies of paying for retirement benefits: the method where contributions match cash benefit payments (or barely exceed cash benefit payments, as in the Federal Social Security program) which is an ***increasing contribution method***; and the ***level contribution method*** which equalizes contributions between the generations.

The actuarial valuation is the mathematical process by which the level contribution rate is determined, and the flow of activity constituting the valuation may be summarized as follows:

A. ***Covered Person Data***, furnished by plan administrator
   Retired lives now receiving benefits
   Former employees with vested benefits not yet payable
   Active employees

B. \+ ***Asset data*** (cash & investments), furnished by plan administrator

C. \+ ***Assumptions concerning future financial experience in various risk areas,*** which assumptions are established by the Retirement System after consulting with the actuary

D. \+ ***The funding method*** the employer contributions (the long-term, planned pattern for employer contributions)

E. \+ ***Mathematically combining the assumptions, the funding method, and the data***

F. = Determination of:
   Plan financial position
   and/or New Employer Contribution Rate

Actuarial Cost Methods Used for the Valuation

Age and Service Benefits. Normal cost and the allocation of actuarial present values between service rendered before and after the valuation date were determined using an individual entry-age actuarial cost method having the following characteristics:

(i) the annual normal costs for each individual active member (usually expressed as a percent-of-payroll), payable from the member's date of hire to the member's projected date of retirement, are sufficient to accumulate the actuarial present value of the member's projected benefit at the time of retirement;

(ii) the actuarial accrued liability under this method is equal to the assets which would have been accumulated had the normal cost contribution been made from the date of entry to the date of the valuation and had all actuarial assumptions been realized.

Casualty Benefits. Normal cost contributions were determined using a one-year term cost method. This method produces contributions sufficient to fund the value of (i) disability benefits likely to be incurred during the year (net of the member's accrued age and service benefits), and (ii) survivor benefits likely to be incurred during the year because of a member's death while employed.

Funding Value of Assets. The funding value of assets is derived as follows: prior year valuation assets are increased by contributions and expected investment income and reduced by refunds and benefit payments. To this amount is added 20% of the difference between expected and actual investment income for each of the previous five years. Funding value of assets may not be less than 80% nor more than 120% of market value.

Amortization of Unfunded Actuarial Accrued Liabilities. Unfunded actuarial accrued liabilities were amortized by level percent-of-payroll contributions (principal and interest combined) over periods described on page C-6.

Active member payroll was assumed to increase 4.00% a year for the purpose of determining the level percent contributions. Characteristics of this method of amortization are illustrated on page C-6.

Schedule of Amortizations for Development of Employer Contribution Rates Attributable to Actuarial Gains and Losses and Changes

Year Established	Initial Years	Years Remaining	Initial Amount	Previous Amount	Current Amount	Amortization Factor	Payment	Previous Payment	Percent-of-Payroll
	Initial Unfunded								
2017		27			$23,149,171	19.5460	$1,184,345		7.99%
	Benefit Changes								
2007	30	20	$4,422,379	$5,055,672	5,086,588	15.5922	326,226	$312,178	2.20%
2008	30	21	390,603	442,834	446,534	16.1948	27,573	26,385	0.19%
2009	30	22	121,354	136,165	137,581	16.7834	8,197	7,844	0.06%
2014	30	27	(135,876)	(141,213)	(143,806)	19.5261	(7,365)	(7,048)	(0.05)%
2016	30	29	954,398	954,398	971,927	20.5451	47,307	45,378	0.32%
2017	30	30	1,322,624	0	1,322,624	21.0413	62,858	0	0.42%
	Actuarial Cost Methods/Assumptions								
2009	30	22	1,503,821	1,687,351	1,704,894	16.7834	101,582	97,208	0.68%
2015	30	28	6,841,876	6,967,535	7,087,389	20.0466	353,547	339,133	2.39%
2017	30	30	4,645,879	0	4,645,879	21.0413	220,798	0	1.49%

This schedule is maintained to arrive at the amortization amount shown on page A-2.

Actuarial Assumptions in the Valuation Process

Contribution requirements and actuarial present values for a retirement system are computed by applying actuarial assumptions to the benefit provisions and member data of the system, using the actuarial cost methods described on page C-5.

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

(i) long-term rates of investment return to be generated by the assets of the system.
(ii) patterns of pay increases to members.
(iii) rates of mortality among members, retirees and beneficiaries.
(iv) rates of withdrawal of active members.
(v) rates of disability among active members.
(vi) the age patterns of actual retirements.

In making a valuation, the monetary effect of each assumption is computed for as long as a present covered person survives - - a period of time which can be as long as a century.

The employer contribution rate has been computed to remain level from year to year so long as benefits and the basic experience and make-up of members do not change. Examples of favorable experience which would tend to reduce the employer contribution rate are:

(1) Investment returns in excess of 6.50% per year.

(2) Member non-vested terminations at a higher rate than outlined on page C-11.

(3) Mortality among retirees and beneficiaries at a higher rate than indicated by the RP-2014 Standard Mortality Tables Projected to 2019 using the MP-2014 mortality improvement scale.

(4) Increases in the number of active members.

Examples of unfavorable experience which would tend to increase the employer contribution rate are:

(1) Pay increases in excess of the rates outlined on page C-9.
(2) An increase in the rate of retirement over the rates outlined on page C-12.
(3) A pattern of hiring employees at older ages than in the past.

Actuarial Assumptions in the Valuation Process (Concluded)

Actual experience of the System will not coincide exactly with assumed experience, regardless of the choice of the assumptions, the skill of the actuary and the precision of the calculations. 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 one or more of the assumptions is modified to reflect experience trends (but not random or temporary year-to-year fluctuations).

Actuarial Assumptions Used for the Valuation

Investment Return (net of administrative expenses).
6.50% per year, compounded annually. This rate consists of a real rate of return of 2.50% a year plus a long-term rate of wage growth of 4.00% a year. There is no specific assumption about price inflation needed for this valuation. The assumptions made would be consistent with a price inflation assumption of 2.75%.

This assumption is used to equate the value of payments due at different points in time and was first used for the June 30, 2017 valuation. Approximate rates of investment return, for the purpose of comparisons with assumed rates, are shown below:

	Year Ended June 30				
	2017	**2016**	**2015**	**2014**	**2013**
Rate of Investment Return	7.3 %	6.1 %	8.8 %	10.2 %	5.3 %

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

These rates of return should not be used for measurement of an investment advisor's performance or for comparisons with other systems -- ***to do so will mislead***.

Pay Projections. These assumptions are used to project current pays to those upon which benefits will be based. The assumptions were first used for the June 30, 2015 valuation.

Sample Years of Service at Beginning of the Year	Annual Rate of Pay Increase for Sample Years of Service		
	Base (Economic)	Merit & Longevity	Total
0	4.00%	12.00%	16.00%
1	4.00%	9.00%	13.00%
2	4.00%	4.30%	8.30%
3	4.00%	3.50%	7.50%
4	4.00%	2.30%	6.30%
5	4.00%	2.00%	6.00%
6	4.00%	1.00%	5.00%
7	4.00%	1.00%	5.00%
8	4.00%	1.00%	5.00%
9 and over	4.00%	0.50%	4.50%
Ref.		299	

Actuarial Assumptions Used for the Valuation (Continued)

If the number of active members remains constant, the total active member payroll and the average pay will increase 4.00% annually, the base portion of the individual pay increase assumptions. This increasing payroll was recognized in amortizing unfunded actuarial accrued liabilities.

Changes actually experienced in average pay and total payroll have been as follows:

	Year Ended June 30					3-Year Average	5-Year Average
	2017	2016	2015	2014	2013		
Average Pay	5.0 %	(0.2)%	3.8 %	4.6 %	(0.9)%	2.8 %	2.4 %
Total Payroll	5.5 %	(0.2)%	6.6 %	8.2 %	(4.6)%	3.9 %	3.0 %

Post-Retirement Mortality Table. The RP-2014 Healthy Annuitant Mortality Table projected to 2019 using the MP-2014 mortality improvement scale. Sample values follow:

Sample Attained Ages	Single Life Retirement Values			
	Present Value of $1 Monthly for Life		Future Life Expectancy (years)	
	Men	Women	Men	Women
50	$158.65	$163.74	33.25	35.95
55	150.69	156.51	28.92	31.44
60	141.14	147.43	24.73	27.02
65	129.54	136.26	20.70	22.74
70	115.76	122.92	16.85	18.67
75	99.89	107.49	13.26	14.86
80	82.44	90.38	10.01	11.41
Ref:	1208 x 1.00	1209 x 1.00		

Actuarial Assumptions Used for the Valuation (Continued)

Disabled Mortality Table. The RP-2014 Disabled Retirees projected to 2019 using the MP-2014 mortality improvement scale. This table was first used for the June 30, 2015 valuation. Sample values follow:

Sample Attained Ages	Single Life Retirement Values			
	Present Value of $1 Monthly for Life		Future Life Expectancy (years)	
	Men	Women	Men	Women
50	$131.52	$144.11	23.75	28.16
55	124.51	137.02	20.96	24.79
60	116.58	128.79	18.26	21.51
65	107.11	118.47	15.56	18.23
70	96.00	106.00	12.93	15.02
75	83.33	92.13	10.41	12.06
80	69.60	77.92	8.08	9.45
Ref:	1258 x 1.00	1259 x 1.00		

Pre-Retirement Mortality Table. The RP-2014 Mortality Table for Employees projected to 2019 using the MP-2014 mortality improvement scale. This table was first used for the June 30, 2015 valuation. Sample values follow:

Sample Attained Ages	Single Life Retirement Values			
	Present Value of $1 Monthly for Life		Future Life Expectancy (years)	
	Men	Women	Men	Women
50	$163.62	$170.53	35.05	39.48
55	155.39	164.31	30.36	34.71
60	145.18	156.33	25.81	30.01
65	132.93	146.02	21.48	25.39
70	118.67	132.96	17.41	20.87
75	102.26	116.83	13.64	16.54
80	83.85	97.19	10.20	12.42
Ref:	1158 x 1.00	1159 x 1.00		

This assumption is used to measure the probabilities of members dying before retirement and the probabilities of each benefit payment being made after retirement.

Actuarial Assumptions Used for the Valuation (Continued)

Rates of separation from active membership. The 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 separating from employment. Fire rates were first used for the June 30, 2002 valuation. Police rates were first used for the June 30, 2009 valuation.

Sample Ages	% of Active Members Separating Within Next Year	
	Police	Fire
30	3.68%	2.90%
35	3.16%	1.50%
40	1.88%	0.60%
45	1.40%	0.50%
50	1.40%	0.50%
55	0.40%	0.50%
60	0.40%	0.50%
Ref.	235 x 0.8	54 x 1

Rates of Disability. These assumptions represent the probabilities of active members becoming disabled.

These rates were first used for the June 30, 2015 valuation.

Sample Ages	% of Active Members Becoming Disabled Within Next Year	
	Male	Female
20	0.06%	0.08%
25	0.06%	0.08%
30	0.06%	0.08%
35	0.06%	0.08%
40	0.15%	0.27%
45	0.20%	0.30%
50	0.37%	0.43%
55	0.67%	0.57%
60	1.06%	0.76%
Ref.	9	10

Actuarial Assumptions Used for the Valuation (Concluded)

Rates of Retirement. These rates are used to measure the probabilities of an eligible member retiring during the next year.

Percent of Active Members Retiring Within Next Year			
Retirement Ages	Police	Fire	
		IAAF	OSP*
50			20%
51			15%
52-56			10%
57			15%
58			25%
59			30%
60-65	35%	20%	100%
66	25%	15%	100%
67	20%	10%	100%
68-71	15%	10%	100%
72	15%	15%	100%
73	25%	25%	100%
74	30%	30%	100%
75 & Over	100%	100%	100%
Ref	552	553	24

Percent of Active Members Retiring Within Next Year		
Service	Police	Fire IAFF
25	60%	30%
26	30%	15%
27	30%	15%
28	30%	15%
29	20%	15%
30	20%	50%
31	20%	40%
32	20%	30%
33	20%	20%
34	20%	20%
35 & Over	100%	100%
Ref	1788	999

** The probability of retirement at first eligibility for Fire (OSP) members is 60%.*

Fire (OSP) members were assumed to be eligible for retirement after attaining age 50 with 25 or more years of service, or age 60 with 10 or more years of service. All others are eligible with 25 years of service at any age or at age 60 regardless of service.

These rates were first used for the June 30, 2009 valuation.

Service based rates for Fire IAFF were adjusted in conjunction with the adoption of the DROP and were first used for the June 30, 2017 valuation.

Lump sum payments included in the calculation of the average pay upon which benefits are computed were assumed to increase benefits by the following percents.

Unused Vacation time: 5% for Represented groups, 8% for Police Lieutenants, and 8.33% for Police Sergeants and Fire OSP

Active Member Group Size. The number of active members was assumed to remain constant. This assumption is unchanged from previous valuations.

Definitions of Technical Terms

***Accrued Service*.** Service credited under the system which was rendered before the date of the actuarial valuation.

***Actuarial Accrued Liability*.** The difference between the actuarial present value of system benefits and the actuarial present value of future normal costs. Also referred to as "past service liability."

***Actuarial Assumptions*.** Estimates of future 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 benefit" between future normal cost and actuarial accrued liabilities. Sometimes referred to as the "actuarial funding method."

***Actuarial Equivalent*.** One series of payments is said to be actuarially equivalent to another series of payments if the two series have the same actuarial present value.

Actuarial Gain (Loss). The difference between actual unfunded actuarial accrued liabilities and anticipated unfunded actuarial accrued liabilities -- during the period between two valuation dates. It is a measurement of the difference between actual and expected experience.

***Actuarial Present Value*.** The amount of funds currently required to provide a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payment.

***Actuary*.** A person who is trained in the applications of probability and compound interest to problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries. The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation A.S.A., and ultimately to Fellowship with the designation of F.S.A.

***Amortization*.** Paying off an interest-discounted amount with periodic payments of interest and (generally) principal -- as opposed to paying it off with a lump sum payment.

***Credited Projected Benefit*.** The portion of a member's projected benefit attributable to service before the valuation date - allocated based on the ratio of accrued service to projected total service and based on anticipated future compensation.

Normal Cost. The portion of the actuarial present value of future benefits that is assigned to the current year by the actuarial cost method. Sometimes referred to as "current service cost."

Definitions of Technical Terms (Concluded)

***Unfunded Actuarial Accrued Liabilities*.** The difference between actuarial accrued liabilities and valuation assets. Sometimes referred to as "unfunded past service liability" or "unfunded supplemental present value."

Most retirement systems have unfunded actuarial accrued liabilities. They arise each time new benefits are added and each time an actuarial loss occurs.

The existence of unfunded actuarial accrued liabilities is not in itself bad, any more than a mortgage on a house is bad. Unfunded actuarial accrued liabilities do not represent a debt that is payable today. What is important is the ability to amortize the unfunded actuarial accrued liabilities and the trend in their amount (after due allowance for devaluation of the dollar).

***Valuation Assets*.** The value of cash, investments and other property belonging to a pension plan, as used for the purpose of an actuarial valuation.

Pensions in an Inflationary Environment

Value of $1,000/month Retirement Benefit to an Individual Who Retires at Age 55 in an Environment of 2.75% Price Inflation

	COLA Rate	
Age	**2.5%**	**0%**
55	$1,000	$1,000
56	998	973
57	995	947
58	993	922
59	990	897
60	988	873
65	976	762
70	964	666
75	952	581
80	941	508
85	930	443

The life expectancy of a 60-year-old male is to age 85. The life expectancy for a 60-year-old female is to age 87. Half of the people will outlive their life expectancy. The effects of even moderate amounts of inflation can be significant for those who live to an advanced age.

Miscellaneous and Technical Assumptions
JUNE 30, 2017

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. 80% of retirees are assumed to have a spouse eligible for the 60% death after retirement survivor benefit.
Pay Increase Timing:	Beginning of (Fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.
Decrement Timing:	All decrements are assumed to occur at the middle of the year.
Eligibility Testing:	Eligibility for benefits is determined using the age nearest birthday and the 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:	Disability and mortality decrements do not operate during the first five years of service. Disability also does not operate during retirement eligibility.
Normal Form of Benefit:	The assumed normal form of benefit is the 60% joint and survivor form.
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.
Approximation:	Liabilities were adjusted by 5.0% (0% for Non-Representative, 8% for Police Lieutenants and 8.33% for Police Sergeants, Fire OSP and IAFF) to allow for lump sums included in final average pay at retirement.

SECTION D

FINANCIAL REPORTING

This information is presented in draft form for review by the System's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the System's financial statements.

Statement of System Assets
as of JUNE 30, 2017 and 2016

	2017	2016
Assets		
Cash and Short-Term Investments	$ 4,385,766	$ 7,980,643
Depository Receipts	0	0
Money Markets	0	0
Receivables		
Accrued Interest and Dividends	388,100	406,232
Investments		
U.S. Government Bonds	7,857,009	5,257,574
Corporate Bonds	15,745,779	14,636,275
Common Stocks	72,327,008	62,460,380
Real Estate	673,773	624,514
Other	37,745,044	41,886,819
	134,348,613	124,865,562
Accounts Receivable	(613,143)	(1,203,444)
Net assets held in trust for pension and health benefits	$138,509,336	$132,048,993

Statement of Changes in System Assets
for the Fiscal Years Ended JUNE 30, 2017 and June 30, 2016

	June 30, 2017 @	June 30, 2016 @
Additions		
Contributions		
Employer	$ 4,228,234	$ 4,164,957
Plan members	1,233,148	1,077,633
Total contributions	5,461,382	5,242,590
Investment Income	11,374,867	2,400,547
Total additions	16,836,249	7,643,137
Deductions		
Benefits	10,355,887	9,441,511
Refunds of contributions	20,019	3,067
Health insurance premiums	0	0
Total deductions	10,375,906	9,444,578
Net Increase	6,460,343	(1,801,441)
Net assets held in trust for pension benefits		
Beginning of year	132,048,993	133,850,434
End of year	$138,509,336	$132,048,993

@ Net of health reserve.

The calculation of realized gains and losses is independent of the calculation of appreciation (depreciation) in the fair value of plan investments. Unrealized gains and losses in investments sold in the current year that had been held for more than one year were included in the net appreciation (depreciation) reported in the prior years and the current year.

Plan Description. The City of Battle Creek Police and Fire Retirement System is a single-employer defined benefit pension plan that covers the Police and Fire employees of the City of Battle Creek.

The plan provides retirement, disability, and death benefits to plan members and their beneficiaries.

Contributions. Plan member contributions are in accordance with the schedule on page B-2.

The employer's funding policy provides for periodic employer contributions based upon a ***fundamental financial objective of having rates of contribution which remain relatively level from generation to generation of the City of Battle Creek citizens.*** To determine the employer contribution rates and to assess the extent to which the fundamental financial objective is being achieved, the System has actuarial valuations prepared annually. In preparing those valuations, the entry age actuarial cost method is used to determine normal cost and actuarial accrued liabilities.

Unfunded actuarial accrued liabilities (full funding credit) are amortized by level percent-of-payroll contributions over a period of future years as outlined on page C-6.

On the basis of the June 30, 2017 actuarial valuation, the employer rates were determined to be as follows:

Contributions for	Percents of Active Member Payroll
Normal Cost	17.67 %
Accrued Liabilities	15.69 %
Total Employer Rate	33.36 %

Required Supplementary Information
Schedule of Funding Progress

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry-Age (b)	Unfunded AAL (UAAL) (b)-(a)	Funded Ratio (a)/(b)	Covered Payroll (c)	UAAL as a Percent of Covered Payroll [(b)-(a)]/(c)
6/30/98	$ 79,796,431	$ 74,796,184	$ (5,000,247)	106.7 %	$ 9,813,441	(51.0)%
6/30/99	87,617,793	78,285,848	(9,331,945)	111.9 %	9,749,682	(95.7)%
6/30/00	95,548,441	83,980,778	(11,567,663)	113.8 %	11,235,312	(103.0)%
6/30/01	101,190,705	87,909,496	(13,281,209)	115.1 %	11,615,098	(114.3)%
6/30/02*	103,950,731	95,368,883	(8,581,848)	109.0 %	11,907,553	(72.1)%
6/30/03#	103,655,770	100,346,606	(3,309,164)	103.3 %	11,885,130	(27.8)%
6/30/04	103,745,735	104,336,169	590,434	99.4 %	12,114,360	4.9 %
6/30/05	102,755,663	110,487,311	7,731,648	93.0 %	12,085,192	64.0 %
6/30/06	103,283,413	114,501,359	11,217,946	90.2 %	12,283,787	91.3 %
6/30/07#	108,245,308	121,823,413	13,578,105	88.9 %	12,358,265	109.9 %
6/30/08#	113,285,618	126,752,205	13,466,587	89.4 %	12,497,433	107.8 %
6/30/09*	112,094,168	133,052,817	20,958,649	84.2 %	11,953,735	175.3 %
6/30/10	112,804,385	137,557,259	24,752,874	82.0 %	12,383,339	199.9 %
6/30/11	115,774,764	140,863,694	25,088,930	82.2 %	12,609,794	199.0 %
6/30/12	115,083,128	145,540,951	30,457,823	79.1 %	12,269,834	248.2 %
6/30/13	117,879,023	149,004,999	31,125,976	79.1 %	11,700,630	266.0 %
6/30/14#	125,526,809	154,037,977	28,511,168	81.5 %	12,656,141	225.3 %
6/30/15*	131,757,916	166,935,341	35,177,425	78.9 %	13,495,955	260.7 %
6/30/16#	135,407,676	171,938,886	36,531,210	78.8 %	13,470,636	271.2 %
6/30/17*#	140,243,417	184,652,198	44,408,781	76.0 %	14,216,474	312.4 %

** Revised actuarial assumptions.*
 # Plan amendment.

Schedule of Employer Contributions

Year Ended June 30	Annual Recommended Contribution
1998	$1,908,106
1999	1,337,217
2000	1,059,168
2001	732,366
2002	622,529
2003	468,005
2004	1,268,053
2005	1,824,879
2006	2,458,298
2007	2,990,893
2008	3,617,333
2009	3,408,721
2010	3,116,270
2011	3,846,195
2012	3,659,617
2013	3,592,634
2014	3,803,408
2015	3,594,446
2016	4,164,957
2017	4,228,234

This information is presented in draft form for review by the City's auditor. Please let us know if there are any items that the auditor changes so that we may maintain consistency with the City's financial statements.

Summary of Actuarial Methods and Assumptions

The information presented in the required supplementary schedules was determined as part of the actuarial valuations at the dates indicated. Additional information as of the latest actuarial valuation follows:

Valuation date	June 30, 2017
Actuarial cost method	Entry-age actuarial cost method
Amortization method	Level percent-of-payroll
Remaining amortization period	30-year closed for benefit improvements and assumption changes 27-year closed for all other liabilities
Asset valuation method	5-year smoothed market with 20% corridor
Actuarial assumptions:	
Investment rate of return	6.50%
Projected salary increases	4.50% - 16.00%
Assumed rate of payroll growth	4.00%
Assumed rate of membership growth	0%
Cost-of-living adjustments	N/A

GRS Retirement Consulting

800.521.0498 | P: 248.799.9000 | F: 248.799.9020 | www.grsconsulting.com

December 21, 2017

Ms. Gail M. Budrow-Bradstreet
City Treasurer
City of Battle Creek
10 N. Division Street, Suite 105
Battle Creek, Michigan 49014

Dear Ms. Budrow-Bradstreet:

Please find enclosed five copies of the Fifty-Fifth Annual Actuarial Valuation of the City of Battle Creek Police and Fire Retirement System as of June 30, 2017.

Sincerely,

David L. Hoffman

DLH:ah
Enclosures

cc: Rehmann Robson (email)
Attention: Mr. Mark T. Kettner

One Towne Square | Suite 800 | Southfield, Michigan 48076-3723