



City of Lansing Police and Fire Retirement System

Actuarial Valuation For Funding and Contributions

as of December 31, 2016

November, 2017

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Executive Summary

November 22, 2017

City of Lansing Police and Fire Retirement System
124 W. Michigan Avenue
8th Floor
Lansing, MI 48933

Members of the Board:

The following report sets forth the Actuarial Valuation of the City of Lansing Police and Fire Retirement System (the System) as of December 31, 2016. The report is based on participant data and asset summary as submitted by the Plan Administrator and City finance department. We relied on this information without auditing it.

INVESTMENT PERFORMANCE

The total Market Value of Plan Assets for the plan year ending December 31, 2016 was \$312,795,888. Plan assets exclude from this a reserve for healthcare benefits. The total yield of the fund for the plan year ending December 31, 2016 was 6.1% on the market value of assets and 6.3% on an actuarial basis, taking into account asset smoothing.

The Plan uses a smoothing method to determine the City's contributions. Under this method, asset gains or losses are spread over a 5-year period. The gains and losses are determined every year by comparing actual investment returns with expected asset performance.

Details of the development of the Actuarial Asset Value are shown in Section 1.2.

FUNDING RECOMMENDATIONS

The total recommended City contribution for fiscal year 2018 is \$12,562,547. Last year the total recommended contribution was \$11,521,768. The increase in cost is due to the adoption of updated assumptions based on the recent experience study.

FUNDING PROGRESS

The Actuarial Accrued Liability as of December 31, 2016 is \$424,264,103 compared to the Actuarial Value of Assets of \$294,311,956 (excluding healthcare reserve), resulting in a plan funded ratio of 69.4%. Using the market value of assets, this ratio is 66.0%.

ASSUMPTION CHANGES

Several changes in assumptions were made, as a result of a full Experience Study conducted in 2016. Changes include the following:

- Decreased rates of inflation, wage inflation, and investment return
- Updated mortality table projections
- Updated rates of retirement, termination, and disability

Actuarial Certification

The purposes of this report are to establish the City contribution for the next fiscal year, and to evaluate the funding progress of the System.

The accounting report for the System, under GASB 67 and 68, is provided under separate cover, and serves a different purpose. All the figures presented in this report are to be used for funding and contribution purposes.

This report is prepared in accordance with generally accepted actuarial principles and practices. In the opinion of the Retirement Board and its actuary, the actuarial assumptions used are reasonable related to Retirement System experience and expectations, and represent the best estimate of Retirement System experience.

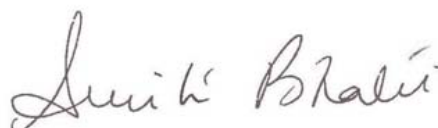
The undersigned below are members of the American Academy of Actuaries, and are qualified to render the actuarial opinions presented in this report.

Respectfully Submitted,

BOOMERSHINE CONSULTING GROUP, L.L.C.



Gregory M. Stump, FSA, EA, MAAA, FCA
Chief Actuary



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Senior Consulting Actuary

Section 1: Plan Asset Information

1.1: Summary of Plan Assets

Market Value of Total Fund as of January 1, 2016		\$310,270,615
<u>Receipts:</u>		
Employer Contribution	11,521,768	
Employer Contribution - Healthcare Reserve	1,601,500	
Member Contributions	2,627,700	
Investment Income		
Interest	1,168,872	
Dividends	1,105,383	
Market Appreciation	15,905,912	
Total Additions		\$33,931,135
<u>Disbursements:</u>		
Member Refunds	0	
Distributions to Participants/ Beneficiaries	30,327,720	
Administrative Expenses and Other	47,787	
Investment Expenses	1,030,355	
Total Disbursements		\$31,405,862
Net Increase/(Decrease) in Assets		<u>\$2,525,273</u>
Market Value of Total Fund as of December 31, 2016		\$312,795,888

Allocation of Net Plan Assets as of December 31, 2016

Asset Class	Market Value	% of Total
Cash and Short Term Investments	\$ 17,169,269	5.5%
Equity	191,257,298	61.1%
Fixed Income	83,787,977	26.8%
Real Estate	22,126,659	7.1%
Accounts payable	<u>(1,545,315)</u>	<u>(0.5%)</u>
TOTAL ASSETS	312,795,888	100%
Estimated Rate of Return on Market Value for 2016	6.1%	

1.2: Development of Actuarial Value of Assets

Market Value of Total Fund as of January 1, 2016	\$310,270,615
Plus: Contributions	15,750,968
Less: Benefit Payments, Refunds	30,327,720
Less: Administrative Expenses	47,787
Plus: Expected Return during 2016 (@ 7.6%, net of investment expenses)	22,677,604
Expected Market Value as of December 31, 2016	\$318,323,680
Actual Market Value of Total Fund as of December 31, 2016	\$312,795,888
Investment Gain/(Loss) for 2016 Plan Year	(5,527,792)
Actuarial Value = Market Value	
Less: 80% of 2016 Gain/(Loss) 80% * (5,527,792)	(4,422,234)
Less: 60% of 2015 Gain/(Loss) 60% * (24,424,402)	(14,654,641)
Less: 40% of 2014 Gain/(Loss) 40% * (5,226,518)	(2,090,607)
Less: 20% of 2013 Gain/(Loss) 20% * 25,936,548	<u>5,187,310</u>
Total Deferred Gain/(Loss)	(15,980,172)
Actuarial Value of Assets, Total Fund - December 31, 2016	\$328,776,060
as % of Market Value of Assets	105.1%
Healthcare Reserve as of December 31, 2016	\$32,788,606
Adjusted Healthcare Reserve ¹	34,464,104
Actuarial Value of Assets, Pension Plan - December 31, 2016	\$294,311,956
Estimated Rate of Return on the Actuarial Value is	6.29%

¹ Takes into account asset smoothing

1.3: Reconciliation of Fund Reserves

	EMPLOYEE SAVINGS FUND	RETIREMENT RESERVE	HEALTHCARE RESERVE	TOTAL
1/1/2016	\$ 26,741,974	\$ 254,632,962	\$28,895,679	\$ 310,270,615
Additions:				
EE Contributions	\$2,627,700			\$2,627,700
ER Contributions		\$11,521,768	\$1,601,500	\$13,123,268
Interest:				
	3.00%	7.60%	7.93%	
Annual Credits	\$802,259	\$17,047,198	\$2,291,427	\$20,140,884
Deductions:				
Refunds/Benefits		\$(30,327,720)		\$(30,327,720)
Adjustment				
	(5,605,392)	2,566,533		(3,038,859)
12/31/2016	\$24,566,541	\$255,440,741	\$32,788,606	\$312,795,888

Employees Savings Fund

<i>Purpose</i>	Keep track of employee contribution balances, and interest credited to such. Interest is credited at 3% annually.
<i>Relevance to Plan Funding</i>	Does not directly impact plan funding

Retirement Reserve Fund

<i>Purpose</i>	Provides funds to finance regular benefit payments to retirees. Interest is credited at the actuarial assumed rate of return.
<i>Relevance to Plan Funding</i>	Does not directly impact plan funding

Healthcare Reserve

<i>Purpose</i>	Funds invested with pension assets, but segregated to be used for retiree healthcare benefits. Interest is credited annually at a rate determined by the City finance office.
<i>Relevance to Plan Funding</i>	Excluded from pension assets to determine contributions towards pension funds

Section 2: Participant Summary

2.1: Reconciliation of Plan Participants

	Active Participants	Non-vested Terminations Due Refunds	Deferred Vested Terminations	Retired	Disabled	Beneficiary	Total
Participants as of December 31, 2015	349	15	23	515	65	142	1,109
Correction	0	0	0	(3)	3	0	0
Retired	(22)	0	(3)	30	(5)	0	0
Terminated Vested	(1)	0	1	0	0	0	0
Terminated Non-Vested (Member Contributions refunded)	(1)	0	0	0	0	0	(1)
Disabled	(1)	0	0	0	1	0	0
Deceased	(1)	0	0	(5)	(2)	(8)	(16)
New Beneficiary / EDRO	0	0	0	0	0	3	3
Rehired	0	0	0	0	0	0	0
Terminated Non-Vested (Member Contributions to be refunded)	(3)	3	0	0	0	0	0
Transfers In from ERS	0	0	0	0	0	0	0
New Hires	41	0	0	0	0	0	41
Data Adjustments	0	0	0	0	0	0	0
Participants as of December 31, 2016	361	18	21	537	62	137	1,136

* Includes distinction made between retiree EDROs and beneficiary EDROs

Inactive Participants	12/31/2015			12/31/2016		
	Fire	Police	Total	Fire	Police	Total
Number of Retired Participants	219	296	515	233	304	537
Average Age	65.2	65.5	65.4	64.9	66.0	65.5
Current Average Annual Benefit	\$51,188	\$44,838	\$47,538	\$52,532	\$45,369	\$48,477
Number of Disabled Participants	40	25	65	36	26	62
Average Age	54.5	54.6	54.5	53.3	54.4	53.8
Current Average Annual Benefit	\$41,394	\$39,861	\$40,804	\$43,141	\$39,533	\$41,628
Number of Beneficiaries/EDROs	69	74	142	68	69	137
Average Age	76.5	73.1	74.7	76.8	72.8	74.8
Current Average Annual Benefit	\$16,863	\$15,914	\$16,368	\$17,590	\$16,041	\$16,810
Number of Deferred Vested Participants	5	18	23	5	16	21
Average Age	43.9	48.6	47.6	44.9	47.3	46.7
Current Average Annual Benefit	\$34,519	\$31,473	\$32,135	\$34,519	\$30,601	\$31,534

2.2: Distribution of Active Participants

Nearest Age	-----Completed Years of Service from Date of Hire-----								Total
	<1	1	2 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25+	
20 - 24	17	2	5						24
25 - 29	15	8	24						47
30 - 34	3		18	12	7				40
35 - 39	5		4	17	20	13			59
40 - 44			2	4	23	39	13		81
45 - 49	1			3	9	25	38	1	77
50 - 54					3	9	14	1	27
55 - 59					1		4		5
60 - 64					1				1
>64									
Total	41	10	53	36	64	86	69	2	361
					<u>Males</u>	<u>Females</u>	<u>Total</u>		
Total Compensation					\$21,680,912	3,718,799	\$25,399,711		
Average Compensation					71,319	65,242	70,359		
Arithmetic Averages:									
Nearest Age					38.8	38.5	38.8		
Completed Years of Service					11.8	11.4	11.8		
Salary-Weighted Averages:									
Nearest Age					40.8	40.3	40.7		
Completed Years of Service					13.7	13.7	13.7		
Number of Participants					304	57	361		
Percent male / female					84.2%	15.8%	100.0%		

Section 3: Valuation Summary

3.1: Summary of Actuarial Liability and Funding Progress

Actuarial Accrued Liability	12/31/2015	12/31/2016	
		Old Assumptions	New Assumptions
	7.60%	7.60%	7.35%
Active Employees	\$106,965,325	\$ 99,027,797	\$103,213,961
Terminated Vested	5,315,759	4,779,120	5,041,817
<u>Retirees and Beneficiaries</u>	<u>297,908,471</u>	<u>303,136,483</u>	<u>316,008,325</u>
Total Actuarial Accrued Liability	\$410,189,555	\$ 406,943,400	\$424,264,103
Actuarial Value of Assets	292,531,481	294,311,956	294,311,956
Net Unfunded Actuarial Accrued Liability	117,658,075	112,631,444	129,952,147
Plan Funding Ratio	71.3%	72.3%	69.4%

3.2: Development of Employer Contributions

		12/31/2015	12/31/2016	
			Old Assumptions	New Assumptions
		7.60%	7.60%	7.35%
1)	Total Entry Age Normal Cost ¹	\$ 6,463,974	\$6,473,877	\$6,538,822
2)	<u>Estimated Employee Contributions</u>	<u>2,625,342</u>	<u>2,613,429</u>	<u>2,613,429</u>
3)	Net City Normal Cost: (1) – (2)	\$3,838,632	\$3,860,448	\$3,925,393
4)	Valuation Payroll	\$ 27,038,601	\$27,673,222	\$27,673,222
5)	City Normal Cost Rate (% of pay): (3) ÷ (4)	14.2%	14.0%	14.2%
6)	Amortization of Unfunded Actuarial Accrued Liability	\$ 7,336,709	\$7,177,070	\$8,289,043
7)	Amortization Rate (% of Pay): (6) ÷ (4)	27.1%	25.9%	30.0%
8)	Total Contribution Rate: (5) + (7)	41.3%	39.9%	44.1%
9)	Projected Fiscal Payroll	\$ 27,876,798	\$28,531,091	\$28,461,908
10)	Total City Contribution: (8) x (9)	\$11,521,768	\$11,379,681	\$12,562,547

Estimated Cash Flow for Next Five Years

Fiscal Year	City Contribution*	Member Contributions	Benefit Payments
2019	\$13,000,000	\$2,700,000	\$30,800,000
2020	13,900,000	2,800,000	31,000,000
2021	14,600,000	2,800,000	31,500,000
2022	15,000,000	2,900,000	32,400,000
2023	15,400,000	3,000,000	33,400,000

* These amounts are based on a return of 7.35% each year. If actual returns are lower, the City contributions will be higher. For example, given a 7.25% return, the City contributions would be \$0.3 million higher per year.

¹ A breakdown of normal cost by bargaining unit is shown in Appendix III.

Section 4: Actuarial Assumptions and Methods

Funding Method:	Entry Age Normal Actuarial Cost Method. The contribution equals the sum of the normal cost and the amount necessary to amortize the unfunded actuarial liability as a level percent of payroll over a closed period of thirty years, decreasing by 1 year to an ultimate period of 15 years (25 years remaining as of December 31, 2016).
Asset Smoothing Method:	Investment gains and losses are determined annually and each is spread over a 5-year period. This is done on a total fund basis, with an 80% - 120% corridor around market value. The value of the healthcare reserve is then excluded from the valuation assets.
Investment Return*:	7.35% compounded annually, net of investment expenses (Previous Year: 7.60%)
Cost of Living (inflation)*:	The cost of living as measured by the Consumer Price Index (CPI) is assumed to increase at the rate of 2.85% per year. (Previous Year: 3.10%)
Salary Increases:	Increases in salary are assumed to be equal to inflation, plus 7.25% for those with less than 5 years of service or 1.00% for all others
Mortality*:	RP2000 with Blue Collar adjustments for males and females. For Disabled members, the disabled versions of these tables are assumed. Each of these tables is projected to 2026 using Scale BB and a 50% factor is applied to the active population.
Percent Married:	90% of participants are assumed to be married. Male spouses are assumed to be three years older than their female spouse.
Disability*:	Rates of disability vary based on the age of the member. 95% of disabilities are assumed to be duty related.

Sample rates are shown below:

<u>Age</u>	<u>Rate (Old)</u>	<u>Rate (New)</u>
20	0.0800%	0.1200%
30	0.4000%	0.6000%
40	0.6250%	0.9375%
50	0.7500%	1.1250%
60	0.0000%	0.0000%

Termination*: Rates of termination vary based on the service of the member.

Sample Rates are shown below:

<u>Years of Service</u>	<u>Fire (No Change)</u>	<u>Police (Old)</u>	<u>Police (New)</u>	
			<u>Age</u>	<u>Rate</u>
0	4.0%	5.0%	20	15.0%
1	3.2%	4.3%	25	7.5%
5	1.3%	2.2%	30	3.7%
10	0.4%	1.0%	35	1.9%
15	0.1%	0.4%	40	0.9%
20	0.0%	0.0%	45	0.3%
			50+	0.0%

Retirement*: Rates of retirement vary based on the service of the member as shown below.

<u>Years of Service</u>	<u>Fire (Old)</u>	<u>Fire (New)</u>	<u>Police (Old)</u>	<u>Police (New)</u>
10-24	5.0%	5.0%	5.0%	5.0%
25	80.0%	90.0%	80.0%	90.0%
26-29	60.0%	60.0%	25.0%	25.0%
30+	100.0%	100.0%	100.0%	100.0%

Also 100% at mandatory retirement ages.

Changes in assumptions and methods

Changes in assumptions since the prior valuation are indicated above with asterisks.

The assumptions above are based on the most recent experience study, covering 2012 through 2015.

Section 5: Summary of Plan Benefits

All benefits are subject to the language in the City Ordinance and relevant collective bargaining agreements.

Employee Group Covered:	Police Officers (CCLP, formerly FOP), and Fire Fighters
Normal Retirement:	Age 55 or 25 years of service For CCLP-NS hired on or after August 1, 2014, full retirement is at age 50 with 25 years of service
Mandatory Retirement:	Age 60 for Police and age 70 for Firefighters
Normal Form of Benefit:	Monthly life annuity with 50% of the benefit payable to the spouse upon the member's death.

	<u>Group</u>	<u>Contribution Rate</u> <u>(% of Pay)</u>
Member Contribution Rates:	Fire (IAFF)	10.00%
	Police, Supervisor (CCLP-S)	9.52%
	Police, Non Supervisor (CCLP-NS)	9.00%
Hires after 5/19/2014	Fire (IAFF)	7.00%
Hires after 08/01/2014	Police, Non Supervisor (CCLP-NS)	7.00%

Included Compensation: For a police officer member, Included Compensation is defined as annual base salary, overtime pay (including holiday pay), longevity, gun allowance, clothing allowances, sick leave reimbursement (buy-back), shift premium and retroactive pay (prorated by effective date). For a Police Supervisory Division Unit member, the definition also includes compensatory time buy-back (up to a maximum of 160 hours), provided that the compensatory time was earned in the same 24 months on which final average compensation is based. For a firefighter member, Included Compensation is defined as annual base salary, overtime pay, acting pay, ambulance wage differential pay, longevity, holiday pay, field training instructor pay and retroactive pay (prorated by effective date).

Final Average Compensation: Final Average Compensation means the monthly average of the member's final compensation that is included in Included Compensation, paid during the period of the member's 24 highest consecutive months of credited service as a police officer, or firefighter. If the member has less than 24 months of credited service, the member's final average compensation shall be the monthly average of the Included Compensation paid for his or her total period of credited service.

Normal Retirement Benefit Formula: 3.2% of Final Average Compensation times years of credited service, not to exceed 25 years. Maximum benefit is 80% of Final Average Compensation. Pension benefit is capped at 110% of Base Wage for IAFF and CCLP-NS and 115% for CCLP-Supervisors.

Benefit Multiplier is changed to 2.5% and Pension Benefit is capped at 100% of Base Wage for hires on or after May 19, 2014 for IAFF and August 1, 2014 for CCLP-NS

Termination Prior to Retirement

Eligibility	Vesting is after 10 years of credited service
Benefit Amount	Benefit is payable beginning at age 55 and computed in the same manner as the Normal Retirement Benefit, but based on credited service and Final Average Compensation at date of termination.

Duty Disability

Eligibility	Members are eligible for Duty Disability Retirement benefits immediately upon employment.
Benefit Amount (Before Retirement Eligibility)	The Duty Disability Retirement Benefit payable to members is equal to 2/3 of Final Average Compensation.
Benefit Amount (After Retirement Eligibility)	Benefit is paid at the effective date of disability retirement as a Life Annuity and is equal to the accrued Retirement Benefit. In computing the benefit amount, credited service is increased to include the period of disability, and Final Average Compensation is calculated using current rates of compensation for those with similar rank.
	The Disability Benefit will be offset by any workers' compensation payable on account of the disability.

Non Duty Disability

Eligibility	Members are eligible for Non Duty Disability Retirement benefits after completing 10 years of service.
Benefit Amount	Benefit is paid at the effective date of disability retirement as a Life Annuity and is equal to the accrued Retirement benefit, with a maximum benefit equal to 2/3 of the annual rate of compensation of either a full-paid patrolman or a full-paid firefighter as of the date of retirement, whichever is higher.

Death incurred in the Line of Duty

Eligibility	The Death in Line of Duty Benefit is payable to the survivors of a member who died as a result of an injury or disease arising out of and in the course of duty.
Benefit Amount - Fire	A benefit, equal to 1/3 of the deceased member's Final Compensation, is payable to the widow or widower. In addition, unmarried children under the age of 21 will receive a benefit equal to 1/4 of the deceased member's Final Compensation, divided equally among children.
Benefit Amount - Police	A benefit is payable to the widow or widower, equal to the greater of 80% of the deceased member's Final Average Compensation, or 80% of the top paid base salary for the rank the officer held at the time of his or her death. Benefit is paid to surviving children if there is no surviving spouse.

Non Duty Pre-Retirement Death

Eligibility	The non-duty pre-retirement death benefit is payable upon the death of a member after earning 10 years of credited service.
Benefit Amount	50% of the accrued retirement benefit, computed in the same manner as the Retirement Benefit payable as a Life Annuity.

Optional Benefit Forms

Prior to retirement, a member may elect a reduced benefit of either 93% or 86% of the original amount, thereby increasing the spouse benefit to either 75% or 86%, respectively.

Ad Hoc Cost-of-Living Adjustments

One-time cost of living increases were granted in 1973, 1984 and 1987.

Post Retirement Benefit Adjustments

Effective January 1, 1995 and each January 1 thereafter, the annual benefit amount will be increased by \$525 for each retiree who meets each of the following conditions:

- 1) 25 or more years of credited service at the time of retirement
- 2) Age 60 as of the January 1 increase date
- 3) Has been retired at least 6 months as of the January 1 increase date

The \$525 amount is reduced for retirees who elected the 75% or 86% optional forms of benefit (\$488.25 and \$451.50, respectively).

Spouses of deceased members are also eligible for benefit increases each January 1 if:

- 1) The deceased member had at least 25 years of credited service at the time of retirement
- 2) The deceased member would have attained at least age 60 as of the January 1 increase date
- 3) The deceased member had been deceased at least 6 months as of the January 1 increase date.

The spouse's annual benefit increase amount is adjusted based on the form of payment elected by the deceased member, according to the following schedule:

<u>Spouse Benefit %</u>	<u>Annual Benefit Increase</u>
50%	\$262.50
75%	\$393.75
86%	\$451.50

The benefit increases accumulate from year to year, but cumulative benefit increases shall not exceed cumulative increases in the Consumer Price Index.

Changes in Plan provisions since the prior valuation

There have been no changes in Plan provisions since the prior valuation.

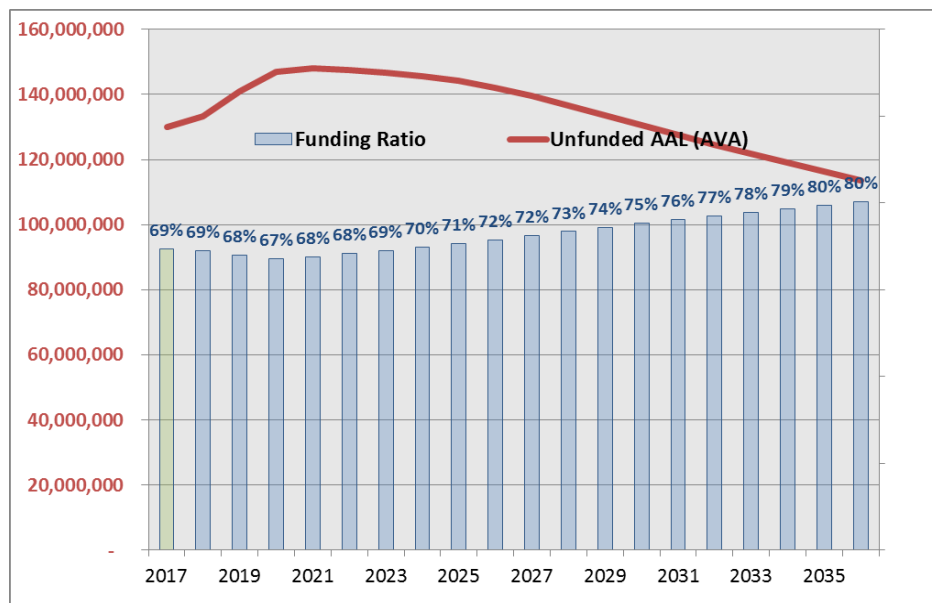
Glossary of Terms

Actuarial Accrued Liability (AAL):	The portion of benefits deemed to be accrued by participants based on past service. The AAL serves as the asset funding target, when annual contributions are determined.
Actuarial Value of Assets (AVA):	The smoothed value of assets, used to compute the Unfunded AAL. The purpose of the AVA is to control volatility in annual cash contributions .
Amortization of Unfunded Liability:	The portion of the annual cash contribution that represents a portion of the Unfunded AAL. The amortization can be positive or negative.
Actuarially Determined Employer Contribution (ADEC):	The contribution determined by the actuary for funding purposes .
Market Value of Assets (MVA):	The total value of Plan assets available to pay benefits.
Normal Cost:	That portion of the annual contribution that represents one year's accrual of benefits. In funding calculations, this is known as the Service Cost.
Unfunded Actuarial Accrued Liability:	The difference between the Actuarial Value of Assets and the Actuarial Accrued Liability, used for funding purposes .

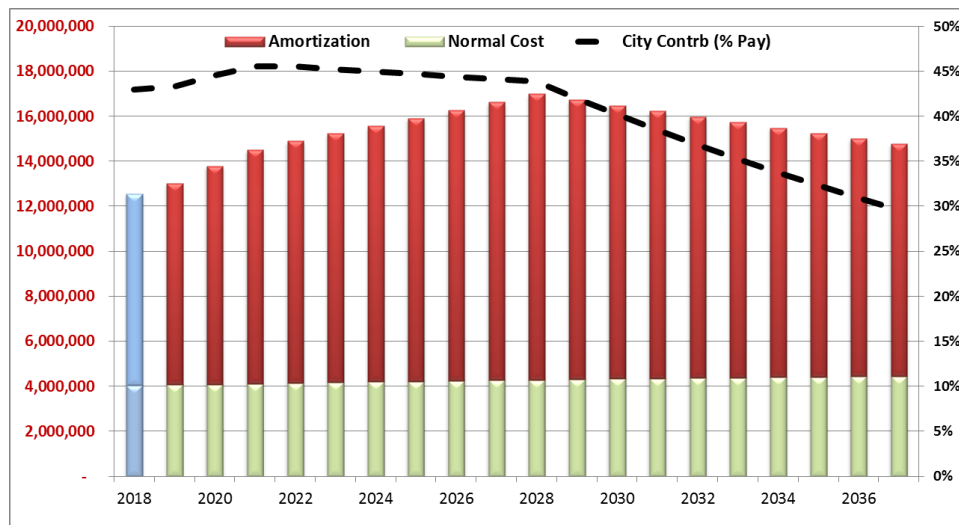
Appendix I: 20 Year Projection of Funding and Contributions

The graphs below show a projection of expected funding progress and City pension contributions to the Fund. We can see that the Plan is on a path to eventually decreasing the unfunded liability (top graph, red line) and improving the funding ratio to 80% over 20 years. During this time, the City contribution rate is expected to remain around 45% of payroll over the next 10 years, before gradually decreasing thereafter. The amounts are expected to increase by about \$4 million over the course of the next decade, before decreasing. The actual funding progress and contributions over this time period will differ from what is shown here, due to the actual experience of the Plan.

Projection of Funding Progress



Projection of City Contributions



Appendix II: History of Employer Contributions and Funding Progress

Historical Employer Contributions

Fiscal Year Ending	Actuarially Determined Employer Contribution	Actual Employer Contribution	
6/30/2009	\$ 6,094,397	\$ 6,483,000	(1)
6/30/2010	7,179,360	6,790,757	(1)
6/30/2011	8,240,688	8,240,688	
6/30/2012	9,242,173	9,057,080	(2)
6/30/2013	10,133,599	10,133,599	(3)
6/30/2014	11,248,857	11,248,857	
6/30/2015	11,050,091	11,050,091	(4)
6/30/2016	10,884,312	10,884,312	
6/30/2017	11,521,768	11,521,768	
6/30/2018	12,562,547	To Be determined	(5)

(1) The City contributed in excess of its FY 2009 ADEC. The City's FY 2010 contribution was reduced by the dollar amount of the FY 2009 overpayment.

(2) The FY 2012 City contribution was reduced by \$185,093 in recognition of additional contributions by International Association of Firefighters (IAFF) employees, which were negotiated and contributed after the establishment of the June 30, 2012 ADEC from the December 31, 2010 valuation.

(3) Fiscal year 2013 ADEC reflects changes made to actuarial assumptions based on an Experience Study. Changes included a decrease in the assumed rate of return from 8.0% to 7.8%. A closed amortization period was also adopted as of 12/31/2011, beginning at 30 years and decreasing each year until 15 years is reached.

(4) Fiscal year 2015 ADEC reflects changes made to assumed return and inflation from 7.8% and 3.3% to 7.6% and 3.1%, respectively. ADEC also reflects change in asset smoothing to immediately recognize all investment gains and losses prior to 12/31/2012.

(5) Reflects changes made to actuarial assumptions as of 12/31/2016, including return assumption of 7.35%, with underlying 2.85% inflation.

Historical Funding Progress

Valuation Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Percentage Funded	Unfunded Actuarial Accrued Liability
12/31/2007	\$ 293,571,000	\$ 315,635,000	93.0%	\$ 22,064,000
12/31/2008	287,394,000	326,673,000	88.0%	39,279,000
12/31/2009	280,342,000	337,315,000	83.1%	56,973,000
12/31/2010	276,377,041	359,293,016	76.9%	82,915,975
12/31/2011	264,492,738	372,547,509	71.0%	108,054,771 (6)
12/31/2012	257,898,061	373,083,911	69.1%	115,185,850
12/31/2013	277,267,947	383,879,280	72.2%	106,611,333 (7)
12/31/2014	288,785,965	395,089,321	73.1%	106,303,356
12/31/2015	292,531,481	410,189,555	71.3%	117,658,075
12/31/2016	294,311,956	424,264,103	69.4%	129,952,147 (8)

(6) Reflects changes made to actuarial assumptions, based on Experience Study, including a reduction in the assumed return 8.0% to 7.8%.

(7) Reflects changes made to assumed return and inflation from 7.8% and 3.3% to 7.6% and 3.1%, respectively. AVA also reflects change in asset smoothing to immediately recognize all investment gains and losses prior to 12/31/2012.

(8) Reflects changes made to actuarial assumptions as of 12/31/2016, including return assumption of 7.35%, with underlying 2.85% inflation.

Appendix III: Benefit Costs by Unit/Formula

Employee Group(s)	# Employees	Benefit Multiplier	Total Normal Cost	% of Pay	Net City Normal Cost	% of Pay
Police I	160	3.20%	\$3,558,322	27.5%	\$2,284,018	17.7%
Police II	38	2.50%	158,636	9.8%	45,267	2.8%
Fire I	122	3.20%	2,469,566	23.4%	1,425,044	13.5%
Fire II	41	2.50%	352,298	13.6%	171,064	6.6%
All Police and Fire Employees	361	N/A	\$6,538,822	23.6%	\$3,925,393	14.2%

Appendix IV: Valuation Sensitivity

The figures shown on this page are based on the return assumption of 7.25%, recommended in the 2016 assumption review.

Actuarial Accrued Liability	12/31/2016
Total Actuarial Accrued Liability	\$428,464,318
Actuarial Value of Assets	294,311,956
Unfunded Actuarial Accrued Liability	134,152,362
Plan Funding Ratio	68.7%

City Contribution	12/31/2016
1) Total Entry Age Normal Cost	\$6,636,904
2) <u>Estimated Employee Contributions</u>	<u>2,706,508</u>
3) Net City Normal Cost: (1) – (2)	\$3,930,396
4) Valuation Payroll	\$27,673,222
5) City Normal Cost Rate (% of pay): (3) ÷ (4)	14.2%
6) Amortization of Unfunded Actuarial Accrued Liability	\$8,560,382
7) Amortization Rate (% of Pay): (6) ÷ (4)	30.9%
8) Total Contribution Rate: (5) + (7)	45.1%
9) Projected Fiscal Payroll	\$28,461,908
10) Total City Contribution for FY2018: (8) x (9)	\$12,834,274