



City of Lansing Employees' Retirement System

Actuarial Valuation For Funding and Contributions

as of December 31, 2017

December, 2018

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Executive Summary

December 17, 2018

City of Lansing Employees' 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 Employees' Retirement System (the System) as of December 31, 2017. 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, 2017 was \$210,587,074. Plan assets exclude from this a reserve for healthcare benefits. The total yield of the fund for the plan year ending December 31, 2017 was 13.2% on the market value of assets and 8.5% 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 on page 8.

FUNDING RECOMMENDATIONS

The total City contribution for fiscal year 2019 is \$9,880,932. Because this is lower than last year's contribution, the City may decide to contribute a higher amount. Changes in actuarial assumptions were made for this valuation, which resulted in an increase in the City Contribution. However, this was offset by favorable demographic experience during 2017.

FUNDING PROGRESS

The Actuarial Accrued Liability as of December 31, 2017 is \$305,043,680 compared to the Actuarial Value of Assets (excluding healthcare reserve) of \$178,646,143, resulting in a plan funded ratio of 58.6%. On a market value basis, this ratio is 59.1%.

ASSUMPTION CHANGES

One change in assumptions was made since the last valuation – a decrease in the assumed rate of return to 7.25%, with an accompanying change in assumed inflation to 2.75%. These changes resulted in an increase in the contribution requirement.

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 has been 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.

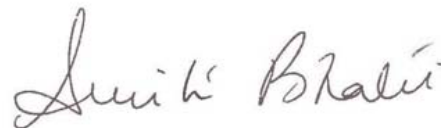
The undersigned below are members of the American Academy of Actuaries, and are qualified to render the actuarial opinions presented in this report.

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, 2017		\$196,865,514
Receipts:		
Employer Contribution - Pension Fund	10,843,000	
Employer Contribution - Healthcare Reserve	200,000	
Member Contributions	1,143,957	
Adjustments Investment Income		
Interest	(64,519)	
Dividends	3,477,399	
Market Appreciation	21,762,112	
Total Additions		\$37,361,948
Disbursements:		
Member Refund	102,743	
Distributions to Participants/ Beneficiaries	22,880,834	
Administrative Expenses and Other	52,430	
Investment Expenses	604,382	
Total Disbursements		\$23,640,388
Net Increase/(Decrease) in Assets		\$13,721,560
Market Value of Total Fund as of December 31, 2017		\$210,587,074
Allocation of Net Plan Assets		
	<u>Market Value</u>	<u>%</u>
Cash and Short Term Investments	23,733,058	11.3%
Equity	84,874,327	40.3%
Fixed Income	77,783,511	36.9%
Real Estate	29,905,301	14.2%
<u>Accounts payable</u>	<u>(5,709,122)</u>	<u>-2.7%</u>
TOTAL ASSETS	\$210,587,074	100.0%
ADJUSTMENT		
TOTAL ASSETS AFTER ADJUSTMENT		
 Estimated Rate of Return on Market Value for 2017:	 13.16%	

1.2: Development of Actuarial Value of Assets

Market Value of Total Fund as of January 1, 2017				\$196,865,514
Plus: Contributions				12,186,957
Less: Benefit Payments, Refunds				22,983,577
Less: Admin Expenses				52,430
Plus: Expected Return during 2017 (@ 7.40%)				13,843,636
Expected Asset Value				\$199,860,100
Market Value of Total Fund as of December 31, 2017				\$210,587,074
Investment Gain/(Loss) for 2017 Plan Year				10,726,974
Market Value of Total Fund as of December 31, 2017				\$210,587,074
Less: 80% of 2016 Gain/(Loss)	80%	*	10,726,974	8,581,579
Less: 60% of 2015 Gain/(Loss)	60%	*	(3,364,585)	(2,018,751)
Less: 40% of 2014 Gain/(Loss)	40%	*	(10,548,489)	(4,219,396)
Less: 20% of 2013 Gain/(Loss)	20%	*	(2,809,882)	(561,976)
Total Deferred Gain/(Loss)				1,781,456
Actuarial Value of Assets, Total Fund - December 31, 2017				\$208,805,618
as % of Market Value of Assets				99.2%
Healthcare Reserve as of December 31, 2017				\$30,418,028
Adjusted Healthcare Reserve¹				30,159,475
Actuarial Value of Assets, Pension Plan - December 31, 2017				\$178,646,143
Estimated Rate of Return on the Actuarial Value is			8.49%	
¹ Takes into account asset smoothing				

1.3: Reconciliation of Fund Reserves

	EMPLOYEE SAVINGS FUND	RETIREMENT RESERVE	MEMBER BENEFIT RESERVE	HEALTHCARE RESERVE	TOTAL
1/1/2017	\$12,577,641	\$140,936,527	\$15,738,432	\$27,612,914	\$196,865,514
Additions:					
EE Contributions	\$ 1,143,957				\$ 1,143,957
ER Contributions		\$ 10,843,000		\$200,000	\$ 11,043,000
Interest:					
	3.00%	7.40%	7.81%	7.81%	
Annual Credits	\$377,329	\$ 8,801,952	\$711,148	\$2,605,114	\$ 12,495,543
Deductions:					
Refunds/Benefits	\$ (102,743)	\$(21,991,227)	\$ (889,607)		\$(22,983,577)
Adjustment/Transfer	\$(1,382,357)	\$ 13,404,994			\$ 12,022,637
12/31/2017	\$ 12,613,827	\$151,995,246	\$ 15,559,973	\$30,418,028	\$210,587,074

Employees Savings Fund

<i>Purpose</i>	Keep track of employee contribution balances, and interest credited to such. Interest is credited annually at 3.0%.
<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 annually at the assumed rate of return.
<i>Relevance to Plan Funding</i>	Does not directly impact plan funding

Member Benefit Reserve

<i>Purpose</i>	Provides funds to finance supplemental benefit payments to retirees based on prior early retirement programs (while reserve balance is positive). Interest is credited annually at a rate determined by the City finance office.
<i>Relevance to Plan Funding</i>	Actuarial liability for supplemental benefit deemed to be equal to the value of the reserve

Healthcare Reserve

<i>Purpose</i>	Funds invested with pension assets, but segregated to be used for retiree healthcare benefits. Interest is credited annually at the same rate as the MBR.
<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	Due Refund	Vested Terminations	Retired	Disabled	Beneficiary	Total
Participants as of December 31, 2016	377	74	73	751	23	129	1,427
Retired	(9)		(4)	13			0
Terminated Vested	(7)		7				0
Terminated Non-Vested (Member Contributions refunded)	(5)						(5)
Disabled	(2)				2		0
Deceased				(20)		(8)	(28)
New Beneficiary / EDRO						11	11
Rehired	2	(2)					0
Terminated Non-Vested (Member Contributions to be refunded)	(11)	11					0
Transfers In		3					3
Transfers to Police and Fire Plan							0
New Hires	49						49
Data Adjustments			(1)	1			0
Participants as of December 31, 2017	394	86	75	745	25	132	1,467

2.2: Demographic Summary

Active Participants	<u>12/31/2016</u>	<u>12/31/2017</u>
Number of Active Participants	377	394
Average Age	49.3	49.0
Average Service	10.6	10.6
Average Salary	\$54,300	\$53,700

Inactive Participants	<u>12/31/2016</u>	<u>12/31/2017</u>
Number of Retired Participants	751	745
Average Age	68.0	68.5
Current Average Annual Benefit	\$27,437	\$26,632
Number of Disabled Participants	23	25
Average Age	63.1	63.4
Current Average Annual Benefit	\$19,704	\$19,568
Number of Beneficiaries/EDROs	129	132
Average Age	72.9	72.9
Current Average Annual Benefit	\$13,530	\$13,216
Number of Deferred Vested Participants	73	75
Average Age	52.4	52.8
Current Average Annual Benefit	\$10,724	\$12,374

Section 3: Valuation Summary

3.1: Summary of Actuarial Liability and Funding Progress

Actuarial Accrued Liability	12/31/2017		
	12/31/2016	Old Assumptions	New Assumptions
	7.40%	7.40%	7.25%
Active Employees	\$54,452,341	\$49,619,817	\$50,277,209
Member Benefit Fund	15,738,432	15,559,973	15,559,973
Terminated Vested	6,435,440	8,949,154	9,087,644
<u>Retirees and Beneficiaries</u>	<u>229,260,292</u>	<u>227,336,610</u>	<u>230,105,470</u>
Total Actuarial Accrued Liability	\$305,886,505	\$301,465,554	\$305,030,296
Actuarial Value of Assets	176,160,086	178,646,143	178,646,143
Unfunded Actuarial Accrued Liability	129,726,419	122,819,411	126,384,153
Plan Funding Ratio	57.6%	59.3%	58.6%

3.2: Development of Employer Contributions

12/31/2017

	12/31/2016	Old Assumptions	New Assumptions
	7.40%	7.40%	7.25%
1) Total Entry Age Normal Cost ¹	\$2,664,411	\$2,669,604	\$2,683,595
2) <u>Estimated Employee Contributions</u>	<u>1,018,614</u>	<u>1,192,454</u>	<u>1,189,617</u>
3) Net City Normal Cost: (1) – (2)	\$1,645,797	\$1,477,150	\$1,493,978
4) Valuation Payroll	\$21,949,911	\$ 23,323,296	\$ 23,284,107
5) City Normal Cost Rate (% of pay): (3) ÷ (4)	7.5%	6.3%	6.4%
6) Amortization of Unfunded Actuarial Accrued Liability	\$8,249,336	\$7,993,359	\$8,252,934
7) Amortization Rate (% of Pay): (6) ÷ (4)	37.6%	34.3%	35.4%
8) Total Contribution Rate: (5) + (7)	45.1%	40.6%	41.9%
9) Projected Fiscal Payroll	\$22,593,044	\$23,664,983	\$23,604,264
10) Total City Contribution: (8) x (9)	\$10,185,060	\$9,609,252	\$9,880,932

Estimated Cash Flow for Next Five Years

Fiscal Year	City Contribution*	Member Contributions	Benefit Payments
2020	\$ 10,300,000	\$ 1,200,000	\$ 23,200,000
2021	\$ 10,600,000	\$ 1,300,000	\$ 23,300,000
2022	\$ 10,700,000	\$ 1,300,000	\$ 23,400,000
2023	\$ 10,900,000	\$ 1,300,000	\$ 23,600,000
2024	\$ 11,200,000	\$ 1,400,000	\$ 23,700,000

* These amounts are based on one set of assumptions. If actual experience is less favorable, then City contributions will be higher.

¹ A breakdown of the 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 10 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 adjusted value of the healthcare reserve is then excluded from the valuation assets.

Investment Return: 7.25% compounded annually, net of investment expenses. Last year's assumption was 7.40%

Cost of Living (inflation): The cost of living as measured by the Consumer Price Index (CPI) is assumed to increase at the rate of 2.75% per year. The previous year's assumption was 2.925%

Salary Increases: Increases in salary are assumed to increase with inflation annually, plus an additional amount that varies based on the service of the member as shown below:

<u>Years of Service</u>	<u>UAW</u>	<u>All Others</u>
0-8	2.35%	1.85%
9-10	2.35%	0.60%
11 +	1.35%	0.60%

Mortality: RP2000 Combined Healthy Tables. 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 as shown below. Half of all disabilities are assumed to be duty related.

Sample rates are shown below:

<u>Age</u>	<u>Rate</u>
20	0.0004
30	0.0004
40	0.0013
50	0.0041
60	0.0090

Termination: Rates of termination vary based on the service of the member. Sample Rates are shown below:

<u>Years of Service</u>	Non-UAW		UAW
	Males	Females	
0	22.0%	33.0%	20.0%
1	18.7%	28.1%	10.0%
2	15.9%	23.8%	4.0%
3	13.5%	20.3%	4.0%
5	9.8%	14.6%	3.0%
10	4.3%	6.5%	1.0%
15	0.0%	0.0%	1.0%
20+	0.0%	0.0%	0.5%

Retirement: Rates of retirement vary based on the age of the member as shown below. Rate is applied only if the member is eligible to retire.

<u>Age</u>	<u>UAW</u>	<u>Age</u>	<u>Others</u>
50-54	50%	50-57	55%
55-64	30%	58	15%
65+	100%	59	5%
		60-64	15%
		65	60%
		65-69	25%
		70+	100%

Changes in assumptions since the prior valuation

The assumptions above are based on the most recent experience study, covering 2012 through 2015. The only changes since the last valuation was the expected investment return, reduced to 7.25% with accompanying reduction in assumed inflation, to 2.75%.

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: Teamsters, UAW, Exempt, District Court (except Judges), Executive Pay, Newly hired elected officials do not become members of this Plan.

Normal Retirement Age (All Members - New Plan): Age 50 with 25 years of service or at age 58 with 8 years of service.

Normal Retirement Age (Old Plan): UAW - Age 50 with 25 years of service or at age 58 with 8 years of service. All Others - 8 years of service and attainment of the earlier of age 58 or the age at which age plus service is at least 65.

Normal Form of Benefit: Single life annuity

<u>Member Contributions:</u>	<u>Old Plan</u>	<u>New Plan</u>
UAW	2.95%	3.00% effective 10/18/2013
Teamsters 214	3.75%	6.5% (5.00% for hires after September 2012)
Teamsters 243 (formerly Teamsters 580)	3.50%	6.35% (5.00% for hires after 5/9/2014) for T243 CTP and Sup
District Court Teamsters	3.50%	5.50% (5.00% for hires after 4/1/2014 for DCT243)
District Court Exempt	4.50%	5.50%
Exempt	3.75%	6.50%
Executive Pay Plan	3.75%	6.50%
Elected Officials	3.25%	No Defined Benefit Plan

Compensation: Member's Salary, wages, and longevity bonus. In addition, Compensation may include up to 80 hours of compensatory time for members not eligible for overtime pay.

Final Average Compensation: The average of the highest annual compensation paid over 2 consecutive years of credited service within the last 10 years of credited service immediately preceding a member's termination of employment.

Normal Retirement Benefit Formula (New Plan):

UAW	2.75% of Final Average Compensation times years of credited service; 1.70% of Final Average Compensation times years of credited service for new hires after October 18, 2013. 1.50% of Final Average Compensation times years of credited service for new hires after January 9, 2017, and for Service after this date for the post 10/18/2013 hires.
Teamsters 214 & Teamsters 243 (formerly Teamsters 580)	1.80% of Final Average Compensation times years of credited service; 1.25% of Final Average Compensation times years of credited service for employees hired after 9/30/2012 in Teamsters 214 and hired after 05/19/2014 in T243 (CTP and Sup).

All Others 1.60% of Final Average Compensation times years of credited service;
1.25% of Final Average Compensation times years of credited service for
new hires after 4/1/14 in DCT243 and 6/1/14 for District Court Exempt

Normal Retirement Benefit Formula (Old Plan):

UAW and Elected Officials 2.75% of Final Average Compensation times for the first 35 years of
credited service, plus 1.5% of Final Average Compensation for the next 5
years of service, plus 1.0% of Final Average Compensation for service in
excess of 40 years, with a maximum of 100% of Final Average
Compensation.

District Court Teamsters 2.30% of Final Average Compensation times years of credited service.

All Others 2.80% of Final Average Compensation times for the first 35 years of
credited service, plus 1.5% of Final Average Compensation for the next 5
years of service, plus 1.0% of Final Average Compensation for service in
excess of 40 years, with a maximum of 100% of Final Average
Compensation.

Termination Prior to Retirement

Eligibility Vesting is after 8 years of credited service

Form of Benefit Benefit is payable as a Life Annuity beginning at age 58 for new Plan
Members and at the age at which age plus service equals 65 for Old Plan
Members (except UAW).

Duty Disability

Eligibility Members are eligible for Duty Disability Retirement benefits immediately
upon employment.

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 additional
service granted to age 60. During the worker's compensation period, the
disability benefit may not exceed the difference between the member's
final compensation and the worker's compensation amount. Upon the
attainment of age 60, disabled retirees are transferred to service
retirement status.

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 minimum
benefit equal to 25% of final average compensation.

Death incurred in the Line of Duty

Eligibility 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 Benefit is paid upon termination of the survivor's workers' compensation
period as a Life Annuity and is equal to the survivor's weekly workers'
compensation converted to an annual basis.

Non-Duty Pre-Retirement Death

Eligibility	The non-duty pre-retirement death benefit is payable upon the death of a member after earning 8 years of credited service.
Benefit Amount	Benefit is paid to the surviving spouse as a Joint and Survivor benefit and is computed in the same manner as the Normal Retirement Benefit.

Optional Benefit Forms

Prior to retirement, a member may elect to convert the retirement allowance into a benefit of equivalent actuarial value in accordance with one of the optional forms described below.

- a. Cash Refund Annuity - If a member dies before receiving the total value of accumulated member contributions, the remaining member contributions are payable to designated beneficiary(ies) at the time of death.
- b. 50% or 100% Joint and Survivor Annuity
- c. Social Security Level Income ("Equating Pension") - Any member who retires prior to age 65 may elect to have his retirement allowance actuarially equated to provide an increase retirement allowance to age 65, and a reduced retirement allowance payable thereafter. The increased retirement allowance shall approximate the sum of the member's reduced retirement allowance payable after age 65 and the member's estimated Social Security Primary Insurance Amount.

Post - Retirement Benefit Adjustments

One-time post-retirement benefit increases were granted in 1984, 1987 and 1998.

Effective January 1, 1999, and each January 1 thereafter, certain eligible retirees and beneficiaries receive annual benefit increases, financed by the Members' Benefit Fund reserve while it maintains a positive balance. Retirees/Beneficiaries must meet both of the following conditions:

- 1) Has been retired at least 6 months as of the January 1 increase date
- 2) Age 60 as of the January 1 increase date

For a retiree/beneficiary who elected a 50% or 100% Joint and Survivor Annuity, the maximum annual increase is equal to \$200 (\$100 for the beneficiary if 50% option is elected) times a ratio of the original Joint and Survivor benefit to the original straight life annuity benefit.

For all other retirees/beneficiaries, the maximum annual increase is \$200.

Changes in Plan provisions since the prior valuation

Non-bargaining members hired on or after January 1, 2017 have a benefit multiplier of 1.25%, and employee contributions of 5% of pay.

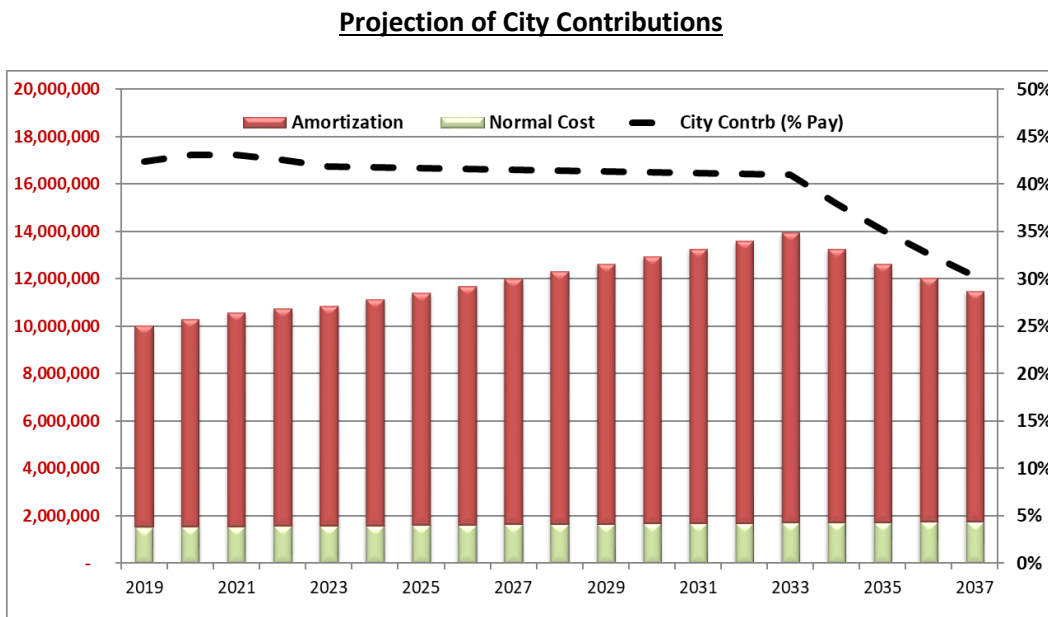
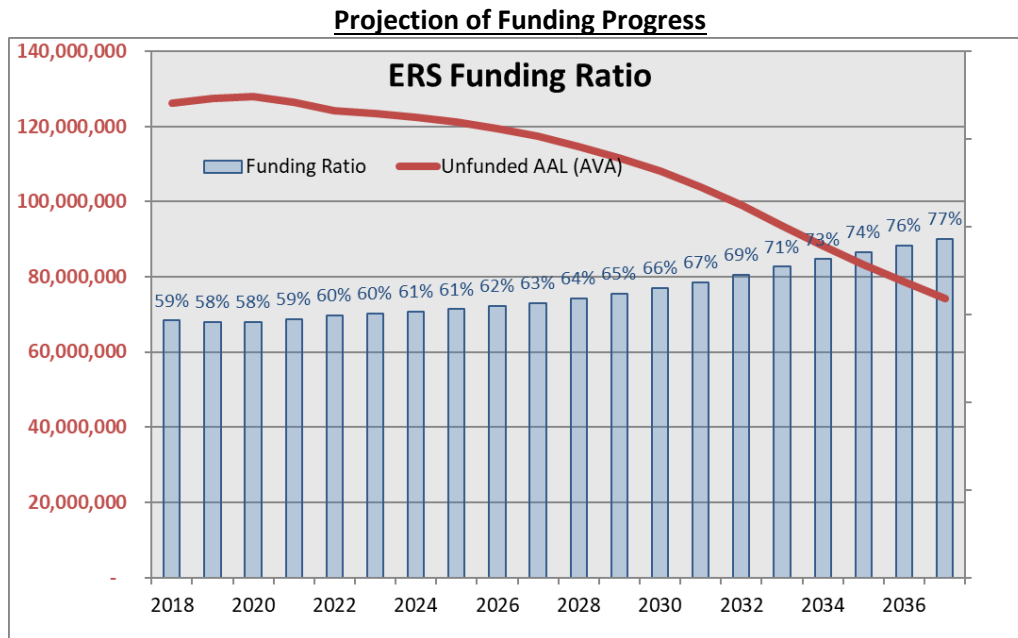
*UAW members hired on or after October 21, 2013 but prior to the ratification of the 2016-2019 agreement (January 9, 2017) have a 1.70% of pay multiplier for credited service prior to the ratification of the 2016-2019 agreement (January 9, 2017) and a 1.50% multiplier for credited service following the ratification of the 2016-2019 agreement (January 9, 2017), except the pension shall not exceed 110% of base wage. UAW members hired on or after ratification of the 2016- 2019 agreement (January 9, 2017) will have a benefit multiplier of 1.50% of pay, except the pension shall not exceed 110% of base wage.

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 contributions to the Fund. We can see that the Plan is on a path to eventually reducing the unfunded liability (top graph, red line) and improving the funding ratio over the next 20 years. During this time, the City contribution rate is expected to remain near 40%-45% of pay, before eventually declining. 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.



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	\$ 6,047,520	\$ 6,476,000	(1)
6/30/2010	6,472,341	6,043,861	(1)
6/30/2011	7,297,083	7,297,083	
6/30/2012	7,596,879	7,523,534	(2)
6/30/2013	8,586,536	8,586,536	(3)
6/30/2014	9,361,000	9,361,000	
6/30/2015	10,548,000	10,548,000	(4)
6/30/2016	10,182,000	10,182,000	
6/30/2017	10,247,000	10,247,000	
6/30/2018	10,185,060	10,843,000	
6/30/2019	9,880,932	To Be Determined	

(1) The City contributed in excess of its FY 2009 Contribution. 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 \$73,345 in recognition of additional contributions by United Auto Workers (UAW) employees, which were negotiated and contributed after the establishment of the June 30, 2012 Contribution from the December 31, 2010 valuation.

(3) Fiscal year 2013 Contribution 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 Contribution reflects changes made to assumed return and inflation from 7.8% and 3.3% to 7.6% and 3.1%, respectively.

(5) Reflects changes made to actuarial assumptions based on an Experience Study completed in 2016, including assumed return of 7.40%, with 2.925% underlying inflation.

Historical Funding Progress

Valuation Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Percentage Funded	Unfunded Actuarial Accrued Liability
12/31/2008	\$200,600,000	\$258,331,000	77.7%	\$57,731,000
12/31/2009	193,324,000	262,298,000	73.7%	68,974,000
12/31/2010	187,440,590	269,461,935	69.6%	82,021,345
12/31/2011	177,100,863	287,306,707	61.6%	110,205,844 (6)
12/31/2012	167,569,807	293,974,433	57.0%	126,404,626
12/31/2013	172,687,582	313,258,746	55.1%	140,571,164 (7)
12/31/2014	177,259,421	309,924,744	57.2%	132,665,323
12/31/2015	176,031,902	308,794,993	57.0%	132,763,091
12/31/2016	176,160,086	309,520,574	56.9%	133,360,488 (8)
12/31/2017	178,646,143	305,030,296	58.6%	126,384,153 (9)

(6) Reflects changes made to actuarial assumptions based on an Experience Study, including a reduction in the assumed investment 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.

(8) Reflects changes made to actuarial assumptions based on an Experience Study completed in 2016, including assumed return of 7.40%, with 2.925% underlying inflation.

(9) Reflects changes made to actuarial assumptions, assumed return of 7.25%, with 2.75% underlying inflation.

Appendix III: Benefit Costs by Unit/Formula

Employee Group(s)	# Employees	Benefit Multiplier	Total Normal Cost	% of Pay	Net Employer Normal Cost	% of Pay
T214, T243, T243DC (I), Teamsters Exempt, NBU DCT (old)	1	2.80%	\$9,309	12.8%	\$4,445	6.1%
T214, T243, T243DC (II), Council Staff	2	2.30%	30,441	26.5%	24,778	21.6%
T214, T243, T243DC (III)	130	1.80%	988,505	11.0%	425,521	4.8%
UAW I	75	1.25%	319,516	8.5%	125,936	3.3%
UAW II	110	2.75%	835,426	15.3%	673,052	12.4%
UAW III	18	1.7%/1.5%	81,777	10.9%	58,531	7.8%
NBU, Exec	46	1.60%	377,953	10.1%	157,845	4.2%
Non-Bargaining IV	3	1.25%	10,984	8.7%	3,944	3.1%
UAW III	9	1.50%	29,684	9.4%	19,926	6.3%
All ERS Employees	394	N/A	2,683,595	11.5%	1,493,978	6.4%

UAW I: hired before 10/21/2013
UAW II: hired on or after 10/21/2013
UAW III: hired on or after 1/9/2017
T214 I: hired before 12/8/2008
T214 II: hired after 12/8/2008 and before 1/1/2015
T214 III: hired on or after 1/1/2015
T243 I: all except District Court
T243 II: hired on or after 5/19/2014
T243DC I: District Court hired before 4/1/2014
T243DC II: District Court hired on or after 4/1/2014 and before 7/1/2016
T243DC III: District Court hired on or after 7/1/2016
Non-Bargaining IV: Hires after 1/1/2017

Appendix IV: Valuation Sensitivity

The figures shown on this page are based on the return assumption of 7.00%.

Actuarial Accrued Liability	12/31/2017
Total Actuarial Accrued Liability	\$311,628,896
Actuarial Value of Assets	178,646,143
Unfunded Actuarial Accrued Liability	\$132,982,752
Plan Funding Ratio	57.3%

City Contribution	12/31/2017
1) Total Entry Age Normal Cost	\$2,799,130
2) <u>Estimated Employee Contributions</u>	<u>1,189,617</u>
3) Net City Normal Cost: (1) – (2)	\$1,609,513
4) Valuation Payroll	\$23,284,107
5) City Normal Cost Rate (% of pay): (3) ÷ (4)	6.9%
6) Amortization of Unfunded Actuarial Accrued Liability	\$8,492,733
7) Amortization Rate (% of Pay): (6) ÷ (4)	36.5%
8) Total Contribution Rate: (5) + (7)	43.4%
9) Projected Fiscal Payroll	\$23,604,264
10) Total City Contribution for FY2019: (8) x (9)	\$10,241,152