

CITY OF EVANSTON
POLICE PENSION FUND
ACTUARIAL VALUATION
AS OF JANUARY 1, 2019
CONTRIBUTIONS APPLICABLE TO THE
PLAN/FISCAL YEAR ENDING DECEMBER 31, 2020



FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

August 2, 2019

Board of Trustees
City of Evanston
Police Pension Fund
2100 Ridge Avenue
Evanston, IL 60201

Re: Actuarial Valuation Report – City of Evanston Police Pension Fund

Dear Board:

We are pleased to present to the Board this report of the annual actuarial valuation of the City of Evanston Police Pension Fund. The valuation was performed to determine whether the assets and contributions are sufficient to provide the prescribed benefits and to develop the appropriate funding requirements for the applicable plan year. Please note that this valuation may not be applicable for any other purposes.

The valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board, and reflects laws and regulations issued to date pursuant to the provisions of Article 3, Illinois Pension Code, as well as applicable federal laws and regulations. In our opinion, the assumptions used in this valuation, as adopted by the Board of Trustees, represent reasonable expectations of anticipated plan experience. Future actuarial measurements may differ significantly from the current measurements presented in this report for a variety of reasons including: changes in applicable laws, changes in plan provisions, changes in assumptions, or plan experience differing from expectations. Due to the limited scope of the valuation, we did not perform an analysis of the potential range of such future measurements.

In conducting the valuation, we have relied on personnel, plan design, and asset information supplied by the Board, financial reports prepared by the custodian bank and the actuarial assumptions and methods described in the Actuarial Assumptions section of this report. While we cannot verify the accuracy of all this information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy of the information and believe that it has produced appropriate results. This information, along with any adjustments or modifications, is summarized in various sections of this report.

The undersigned is familiar with the immediate and long-term aspects of pension valuations and meets the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. All of the sections of this report are considered an integral part of the actuarial opinions.

To our knowledge, no associate of Foster & Foster, Inc. working on valuations of the program has any direct financial interest or indirect material interest in the City of Evanston, nor does anyone at Foster & Foster, Inc. act as a member of the Board of Trustees of the City of Evanston Police Pension Fund. Thus, there is no relationship existing that might affect our capacity to prepare and certify this actuarial report.

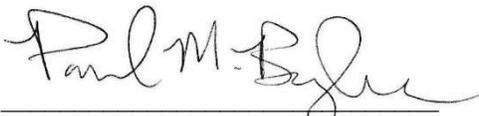
If there are any questions, concerns, or comments about any of the items contained in this report, please contact us at 630-620-0200.

Respectfully submitted,

Foster & Foster, Inc.

By: 
Jason L. Franken, FSA, EA, MAAA

By: 
Heidi E. Andorfer, FSA, EA, MAAA

By: 
Paul M. Baugher, FSA, EA, MAAA

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Enclosures

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SUMMARY OF REPORT

The regular annual actuarial valuation of the City of Evanston Police Pension Fund, performed as of January 1, 2019, has been completed and the results are presented in this Report. The contribution amounts set forth herein are applicable to the plan/fiscal year ended December 31, 2020.

The contribution requirements, compared with those set forth in the January 1, 2018 actuarial report, are as follows:

Valuation Date	1/1/2019	1/1/2018
Applicable to Fiscal Year Ending	<u>12/31/2020</u>	<u>12/31/2019</u>
Total Recommended Contribution	\$13,488,464	\$12,701,183
% of Projected Annual Payroll	85.7%	81.3%
Member Contributions (Est.)	1,560,593	1,547,438
% of Projected Annual Payroll	9.9%	9.9%
City Recommended Contribution	11,927,871	11,153,745
% of Projected Annual Payroll	75.8%	71.4%

As you can see, the Total Recommended Contribution shows an increase when compared to the results determined in the January 1, 2018 actuarial valuation report. The increase is primarily attributable to assumption changes reflected in this valuation and unfavorable plan experience during the year

Sources of unfavorable experience included an investment return of 5.53% (Actuarial Asset Basis) which fell short of the 6.25% assumption, less inactive mortality than expected, and more retirements than expected. There were no significant sources of favorable experience.

CHANGES SINCE PRIOR VALUATION

Plan Changes Since Prior Valuation

No plan changes have occurred since the prior valuation.

Actuarial Assumption/Method Changes Since Prior Valuation

The valuation reflects the following assumption change:

- The mortality rates were updated to reflect the PubS.H-2010 tables.

There were no method changes since the prior valuation.

COMPARATIVE SUMMARY OF PRINCIPAL VALUATION RESULTS

	New Assump <u>1/1/2019</u>	Old Assump <u>1/1/2019</u>	<u>1/1/2018</u>
A. Participant Data			
Number Included			
Actives	158	158	163
Service Retirees	137	137	134
Beneficiaries	28	28	30
Disability Retirees	18	18	17
Terminated Vested	<u>20</u>	<u>20</u>	<u>18</u>
Total	361	361	362
Total Annual Payroll	\$15,747,659	\$15,747,659	\$15,614,913
Payroll Under Assumed Ret. Age	15,747,659	15,747,659	15,614,913
Annual Rate of Payments to:			
Service Retirees	10,183,809	10,183,809	9,626,349
Beneficiaries	1,052,666	1,052,666	1,098,598
Disability Retirees	809,975	809,975	734,813
Terminated Vested	145,066	145,066	145,066
B. Assets			
Actuarial Value	122,344,568	122,344,568	115,898,879
Market Value	116,755,057	116,755,057	121,629,667
C. Liabilities			
Present Value of Benefits			
Actives			
Retirement Benefits	105,725,655	103,480,684	101,106,922
Disability Benefits	9,161,107	8,154,366	8,058,364
Death Benefits	1,079,450	2,139,953	2,135,207
Vested Benefits	7,328,825	7,257,893	7,166,105
Service Retirees	146,436,163	144,696,421	137,430,697
Beneficiaries	8,910,528	8,815,478	9,320,481
Disability Retirees	12,292,570	11,326,876	10,559,438
Terminated Vested	<u>1,849,169</u>	<u>1,831,586</u>	<u>1,717,250</u>
Total	292,783,467	287,703,257	277,494,464

C. Liabilities - (Continued)	New Assump <u>1/1/2019</u>	Old Assump <u>1/1/2019</u>	<u>1/1/2018</u>
Present Value of Future Salaries	164,807,708	164,000,080	164,003,250
Present Value of Future Member Contributions	16,332,444	16,252,408	16,252,722
Normal Cost (Retirement)	3,217,964	3,144,377	3,132,011
Normal Cost (Disability)	571,110	511,455	507,807
Normal Cost (Death)	54,722	98,598	98,828
Normal Cost (Vesting)	<u>415,353</u>	<u>412,091</u>	<u>403,887</u>
Total Normal Cost	4,259,149	4,166,521	4,142,533
Present Value of Future Normal Costs	40,305,495	39,201,267	39,869,402
Accrued Liability (Retirement)	74,535,732	73,144,797	70,288,610
Accrued Liability (Disability)	3,576,630	3,171,683	3,023,667
Accrued Liability (Death)	592,740	1,267,917	1,237,845
Accrued Liability (Vesting)	4,284,440	4,247,232	4,047,074
Accrued Liability (Inactives)	<u>169,488,430</u>	<u>166,670,361</u>	<u>159,027,866</u>
Total Actuarial Accrued Liability	252,477,972	248,501,990	237,625,062
Unfunded Actuarial Accrued Liability (UAAL)	130,133,404	126,157,422	121,726,183
Funded Ratio (AVA / AL)	48.5%	49.2%	48.8%

	New Assump <u>1/1/2019</u>	Old Assump <u>1/1/2019</u>	<u>1/1/2018</u>
D. Actuarial Present Value of Accrued Benefits			
Vested Accrued Benefits			
Inactives	169,488,430	166,670,361	159,027,866
Actives	23,790,321	23,164,117	22,843,027
Member Contributions	<u>15,330,841</u>	<u>15,330,841</u>	<u>14,836,983</u>
Total	208,609,592	205,165,319	196,707,876
Non-vested Accrued Benefits	<u>5,602,163</u>	<u>5,533,105</u>	<u>4,674,373</u>
Total Present Value Accrued Benefits	214,211,755	210,698,424	201,382,249
Funded Ratio (MVA / PVAB)	54.5%	55.4%	60.4%
Increase (Decrease) in Present Value of Accrued Benefits Attributable to:			
Plan Amendments	0	0	
Assumption Changes	3,513,331	0	
New Accrued Benefits	0	9,040,522	
Benefits Paid	0	(11,937,685)	
Interest	0	12,213,338	
Other	<u>0</u>	<u>0</u>	
Total	3,513,331	9,316,175	

Valuation Date	New Assump 1/1/2019	Old Assump 1/1/2019	1/1/2018
Applicable to Fiscal Year Ending	<u>12/31/2020</u>	<u>12/31/2020</u>	<u>12/31/2019</u>
E. Pension Cost			
Normal Cost ¹	\$4,525,346	\$4,426,929	\$4,401,441
% of Total Annual Payroll ¹	28.7	28.1	28.2
Administrative Expenses ¹	62,565	62,565	157,920
% of Total Annual Payroll ¹	0.4	0.4	1.0
Payment Required to Amortize Unfunded Actuarial Accrued Liability over 22 years (as of 1/1/2019) ¹	8,900,553	8,596,893	8,141,822
% of Total Annual Payroll ¹	56.6	54.6	52.1
Total Recommended Contribution	13,488,464	13,086,387	12,701,183
% of Total Annual Payroll ¹	85.7	83.1	81.3
Expected Member Contributions ¹	1,560,593	1,560,593	1,547,438
% of Total Annual Payroll ¹	9.9	9.9	9.9
Expected City Contribution	11,927,871	11,525,794	11,153,745
% of Total Annual Payroll ¹	75.8	73.2	71.4
F. Past Contributions			
Plan Years Ending:	<u>12/31/2018</u>		
Total Recommended Contribution	12,653,752		
City	11,083,443		
Actual Contributions Made:			
Members (excluding buyback)	1,570,309		
City	<u>10,462,704</u>		
Total	12,033,013		
G. Net Actuarial (Gain)/Loss	4,702,452		

¹ Contributions developed as of 1/1/2019 displayed above have been adjusted to account for assumed interest.

H. Schedule Illustrating the Amortization of the Total Unfunded Actuarial Accrued Liability as of:

<u>Year</u>	<u>Projected Unfunded Accrued Liability</u> ¹
2019	104,885,607
2020	102,540,405
2021	100,048,627
2026	85,049,672
2031	64,739,869
2036	37,238,748
2041	0

¹ Target funded percentage is less than 100% so not all of the Unfunded Actuarial Accrued Liability is amortized.

I. (i) 3 Year Comparison of Actual and Assumed Salary Increases

		<u>Actual</u>	<u>Assumed</u>
Year Ended	12/31/2018	4.95%	4.41%
Year Ended	12/31/2017	4.49%	4.41%
Year Ended	12/31/2016	4.55%	4.34%

(ii) 3 Year Comparison of Investment Return on Actuarial Value

		<u>Actual</u>	<u>Assumed</u>
Year Ended	12/31/2018	5.53%	6.25%
Year Ended	12/31/2017	8.22%	6.25%
Year Ended	12/31/2016	7.22%	6.50%

DEVELOPMENT OF JANUARY 1, 2019 AMORTIZATION PAYMENT

(1)	Unfunded Actuarial Accrued Liability as of January 1, 2018	\$121,726,183
(2)	Sponsor Normal Cost developed as of January 1, 2018	2,595,095
(3)	Expected administrative expenses for the year ended December 31, 2018	148,631
(4)	Expected interest on (1), (2) and (3)	7,774,725
(5)	Sponsor contributions to the System during the year ended December 31, 2018	10,462,704
(6)	Expected interest on (5)	326,960
(7)	Expected Unfunded Actuarial Accrued Liability as of December 31, 2018, (1)+(2)+(3)+(4)-(5)-(6)	121,454,970
(8)	Change to UAAL due to Assumption Change	3,975,982
(9)	Change to UAAL due to Actuarial (Gain)/Loss	4,702,452
(10)	Unfunded Accrued Liability as of January 1, 2019	130,133,404
(11)	UAAL Subject to Amortization (90% AAL less Actuarial Assets)	104,885,607

<u>Date</u> <u>Established</u>	<u>Years</u> <u>Remaining</u>	<u>1/1/2019</u> <u>Amount</u>	<u>Amortization</u> <u>Amount</u>
1/1/2019	22	104,885,607	8,376,991

DETAILED ACTUARIAL (GAIN)/LOSS ANALYSIS

(1) Unfunded Actuarial Accrued Liability (UAAL) as of January 1, 2018	\$121,726,183
(2) Expected UAAL as of January 1, 2019	121,454,970
(3) Summary of Actuarial (Gain)/Loss, by component:	
Investment Return (Actuarial Asset Basis)	835,573
Salary Increases	622,703
Active Decrements	1,403,913
Inactive Mortality	1,014,232
Other	<u>826,031</u>
Change in UAAL due to (Gain)/Loss	4,702,452
Assumption Changes	<u>3,975,982</u>
(4) Actual UAAL as of January 1, 2019	\$130,133,404

RECONCILIATION OF CHANGES IN CONTRIBUTION REQUIREMENT

(1) Contribution Determined as of January 1, 2018	\$ 11,153,745
(2) Summary of Contribution Impact by component:	
Change in Normal Cost	25,488
Change in Assumed Administrative Expense	(95,355)
Investment Return (Actuarial Asset Basis)	57,150
Salary Increases	42,590
Active Decrements	96,021
Inactive Mortality	69,369
Contributions (More) or Less than Recommended	54,337
Change in Expected Member Contributions	(13,155)
Assumption Change	402,077
Other	<u>135,604</u>
Total Change in Contribution	774,126
(3) Contribution Determined as of January 1, 2019	\$11,927,871

STATUTORY MINIMUM REQUIRED CONTRIBUTION

Contribution requirements shown on this page are calculated according to statutory minimum funding requirements of the Illinois Pension Code. We do not believe this method is sufficient to fund future benefits; as such, we recommend funding according to the contributions developed in Section E of this report.

Valuation Date Applicable to Fiscal Year Ending	New Assump 1/1/2019 <u>12/31/2020</u>	Old Assump 1/1/2019 <u>12/31/2020</u>	1/1/2018 <u>12/31/2019</u>
Actuarial Accrued Liability (PUC)	244,576,620	240,529,949	229,937,112
Actuarial Value of Assets	<u>122,344,568</u>	<u>122,344,568</u>	<u>115,898,879</u>
Unfunded Actuarial Accrued Liability (UAAL)	122,232,052	118,185,381	114,038,233
UAAL Subject to Amortization	97,774,390	94,132,386	91,044,522
Normal Cost ¹	\$5,018,596	\$4,924,047	\$4,851,511
% of Total Annual Payroll ¹	31.9	31.3	31.1
Administrative Expenses ¹	62,565	62,565	157,920
% of Total Annual Payroll ¹	0.4	0.4	1.0
Payment Required to Amortize Unfunded Actuarial Accrued Liability over 22 years (as of 1/1/2019) ¹	6,133,635	5,905,163	5,528,140
% of Total Annual Payroll ¹	38.9	37.5	35.4
Total Required Contribution	11,214,796	10,891,775	10,537,571
% of Total Annual Payroll ¹	71.2	69.2	67.5
Expected Member Contributions ¹	1,560,593	1,560,593	1,547,438
% of Total Annual Payroll ¹	9.9	9.9	9.9
Expected City Contribution	9,654,203	9,331,182	8,990,133
% of Total Annual Payroll ¹	61.3	59.3	57.6
Assumptions and Methods:			
Actuarial Cost Method	Projected Unit Credit		
Amortization Method	90% Funding by 2040		
Payroll Growth Assumption	3.50%		

All other assumptions and methods are as described in the Actuarial Assumptions and Methods section.

¹ Contributions developed as of 1/1/2019 displayed above have been adjusted to account for assumed interest.

PROJECTION OF BENEFIT PAYMENTS

Year	Payments for Current Actives	Payments for Current Inactives	Total Payments
2019	362,272	12,055,440	12,417,712
2020	676,868	12,127,115	12,803,983
2021	1,014,474	12,329,007	13,343,481
2022	1,357,378	12,517,188	13,874,566
2023	1,763,208	12,703,532	14,466,740
2024	2,181,115	12,815,316	14,996,431
2025	2,605,089	12,901,178	15,506,267
2026	3,145,467	12,976,689	16,122,156
2027	3,634,641	13,024,316	16,658,957
2028	4,225,011	13,024,828	17,249,839
2029	4,831,258	13,005,426	17,836,684
2030	5,539,615	12,939,388	18,479,003
2031	6,320,190	12,836,445	19,156,635
2032	7,128,362	12,694,563	19,822,925
2033	7,988,740	12,530,044	20,518,784
2034	8,843,178	12,306,277	21,149,455
2035	9,721,136	12,039,381	21,760,517
2036	10,607,148	11,758,396	22,365,544
2037	11,442,278	11,406,169	22,848,447
2038	12,266,183	11,012,623	23,278,806
2039	13,110,648	10,580,192	23,690,840
2040	13,878,559	10,112,340	23,990,899
2041	14,669,178	9,633,093	24,302,271
2042	15,483,576	9,109,185	24,592,761
2043	16,187,354	8,590,296	24,777,650
2044	16,949,950	8,035,245	24,985,195
2045	17,572,173	7,473,780	25,045,953
2046	18,235,785	6,912,517	25,148,302
2047	18,702,320	6,357,725	25,060,045
2048	19,108,157	5,814,969	24,923,126
2049	19,440,356	5,289,026	24,729,382
2050	19,719,702	4,783,843	24,503,545
2051	19,945,919	4,302,739	24,248,658
2052	20,121,811	3,848,325	23,970,136
2053	20,241,969	3,422,279	23,664,248
2054	20,307,711	3,025,506	23,333,217
2055	20,312,160	2,658,500	22,970,660
2056	20,256,576	2,321,410	22,577,986
2057	20,135,371	2,013,956	22,149,327
2058	19,946,824	1,735,539	21,682,363

ACTUARIAL ASSUMPTIONS AND METHODS

Interest Rate	6.25% per year compounded annually, net of investment related expenses. We will continue to monitor this assumption to ensure that the rate continues to be supported.
Mortality Rate	<p><i>Active Lives:</i> PubS.H-2010 Employee mortality, projected 5 years past the valuation date with Scale MP-2018. 10% of active deaths are assumed to be in the line of duty.</p> <p><i>Inactive Lives:</i> PubS.H-2010 Healthy Retiree mortality, projected 5 years past the valuation date with Scale MP-2018.</p> <p><i>Beneficiaries:</i> PubS.H-2010 Survivor mortality, projected 5 years past the valuation date with Scale MP-2018.</p> <p><i>Disabled Lives:</i> PubS.H-2010 Disabled mortality, projected 5 years past the valuation date with Scale MP-2018.</p> <p>The mortality assumptions sufficiently accommodate anticipated future mortality improvements.</p>
Retirement Age	See table later in this section. This is based on a 2017 experience study performed for the State of Illinois Department of Insurance.
Disability Rate	See table later in this section. 60% of the disabilities are assumed to be in the line of duty. This is based on a 2017 experience study performed for the State of Illinois Department of Insurance.
Termination Rate	See table later in this section. This is based on a 2017 experience study performed for the State of Illinois Department of Insurance.
Inflation	2.50%.
Cost-of-Living Adjustment	<p><u>Tier 1:</u> 3.00% per year after age 55. Those that retire prior to age 55 receive an increase of 1/12 of 3.00% for each full month since benefit commencement upon reaching age 55.</p> <p><u>Tier 2:</u> 1.25% per year after the later of attainment of age 60 or first anniversary of retirement.</p>

Salary Increases

Graded schedule based age.

Age	Increase
25	7.36%
30	5.48%
35	4.53%
40	4.02%
45	3.81%
50	3.68%
55+	3.62%

Marital Status

80% of Members are assumed to be married.

Spouse's Age

Males are assumed to be three years older than females.

Funding Method

Entry Age Normal Cost Method.

Actuarial Asset Method

Investment gains and losses are smoothed over a 5-year period.

Funding Policy Amortization Method

The UAAL is amortized according to a Level Percentage of Payroll method over a period ending in 2040. The initial amortization amount is 90% of the Accrued Liability less the Actuarial Value of Assets.

Payroll Growth

None.

Administrative Expenses

Expenses paid out of the fund other than investment-related expenses are assumed to be equal to those paid in the previous year.

Decrement Tables

% Terminating During the Year		% Becoming Disabled During the Year		% Retiring During the Year (Tier 1)		% Retiring During the Year (Tier 2)	
Age	Rate	Age	Rate	Age	Rate	Age	Rate
20	14.00%	20	0.000%	50 - 51	15%	50 - 54	5%
25	10.40%	25	0.030%	52 - 54	20%	55	40%
30	5.60%	30	0.140%	55 - 64	25%	56 - 64	25%
35	3.10%	35	0.260%	65 - 69	40%	65 - 69	40%
40	1.90%	40	0.420%	70+	100%	70+	100%
45	1.50%	45	0.590%				
50	1.50%	50	0.710%				
56+	0.00%	55	0.900%				
		60	1.150%				

GLOSSARY

Total Annual Payroll is the projected annual rate of pay for the fiscal year following the valuation date of all covered members.

Present Value of Benefits is the single sum value on the valuation date of all future benefits to be paid to current Members, Retirees, Beneficiaries, Disability Retirees and Vested Terminations.

Normal (Current Year's) Cost is the current year's cost for benefits yet to be funded.

Unfunded Accrued Liability is a liability which arises when a pension plan is initially established or improved and such establishment or improvement is applicable to all years of past service.

Total Recommended Contribution is equal to the Normal Cost plus an amount sufficient to amortize the Unfunded Accrued Liability over a period ending in 2040. The recommended amount is adjusted for interest according to the timing of contributions during the year.

Entry Age Normal Cost Method - Under this method, the normal cost is the sum of the individual normal costs for all active participants. For an active participant, the normal cost is the participant's normal cost accrual rate, multiplied by the participant's current compensation.

- (a) The normal cost accrual rate equals:
 - (i) the present value of future benefits for the participant, determined as of the participant's entry age, divided by
 - (ii) the present value of the compensation expected to be paid to the participant for each year of the participant's anticipated future service, determined as of the participant's entry age.
- (b) In calculating the present value of future compensation, the salary scale is applied both retrospectively and prospectively to estimate compensation in years prior to and subsequent to the valuation year based on the compensation used for the valuation.
- (c) The accrued liability is the sum of the individual accrued liabilities for all participants and beneficiaries. A participant's accrued liability equals the present value, at the participant's attained age, of future benefits less the present value at the participant's attained age of the individual normal costs payable in the future. A beneficiary's accrued liability equals the present value, at the beneficiary's attained age, of future benefits. The unfunded accrued liability equals the total accrued liability less the actuarial value of assets.
- (d) Under this method, the entry age used for each active participant is the participant's age at the time he or she would have commenced participation if the plan had always been in existence under current terms, or the age as of which he or she first earns service credits for purposes of benefit accrual under the current terms of the plan.

DISCUSSION OF RISK

ASOP No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions, states that the actuary should identify risks that, in the actuary's professional judgment, may reasonably be anticipated to significantly affect the plan's future financial condition.

Throughout this report, actuarial results are determined under various assumption scenarios. These results are based on the premise that all future plan experience will align with the plan's actuarial assumptions; however, there is no guarantee that actual plan experience will align with the plan's assumptions. Whenever possible, the recommended assumptions in this report reflect conservatism to allow for some margin of unfavorable future plan experience. However, it is still possible that actual plan experience will differ from anticipated experience in an unfavorable manner that will negatively impact the plan's funded position.

Below are examples of ways in which plan experience can deviate from assumptions and the potential impact of that deviation. Typically, this results in an actuarial gain or loss representing the current-year financial impact on the plan's unfunded liability of the experience differing from assumptions; this gain or loss is amortized over a period of time determined by the plan's amortization method. When assumptions are selected that adequately reflect plan experience, gains and losses typically offset one another in the long term, resulting in a relatively low impact on the plan's contribution requirements associated with plan experience. When assumptions are too optimistic, losses can accumulate over time and the plan's amortization payment could potentially grow to an unmanageable level.

- Investment Return: When the rate of return on the Actuarial Value of Assets falls short of the assumption, this produces a loss representing assumed investment earnings that were not realized. Further, it is unlikely that the plan will experience a scenario that matches the assumed return in each year as capital markets can be volatile from year to year. Therefore, contribution amounts can vary in the future.
- Salary Increases: When a plan participant experiences a salary increase that was greater than assumed, this produces a loss representing the cost of an increase in anticipated plan benefits for the participant as compared to the previous year. The total gain or loss associated with salary increases for the plan is the sum of salary gains and losses for all active participants.
- Payroll Growth: The plan's payroll growth assumption, if one is used, causes a predictable annual increase in the plan's amortization payment in order to produce an amortization payment that remains constant as a percentage of payroll if all assumptions are realized. If payroll does not increase according to the plan's payroll growth assumption, the plan's amortization payment can increase significantly as a percentage of payroll even if all assumptions other than the payroll growth assumption are realized.
- Demographic Assumptions: Actuarial results take into account various potential events that could happen to a plan participant, such as retirement, termination, disability, and death. Each of these potential events is assigned a liability based on the likelihood of the event and the financial consequence of the event for the plan. Accordingly, actuarial liabilities reflect a blend of financial consequences associated with various possible outcomes (such as retirement at one of various possible ages). Once the outcome is known (e.g. the participant retires) the liability is adjusted to reflect the known outcome. This adjustment produces a gain or loss depending on whether the outcome was more or less favorable than other outcomes that could have occurred.

- Contribution risk: Risks associated with the items outlined above will inherently create varying liabilities and assets resulting in volatility in contributions. Actuarial losses on assets and liabilities will lead to higher contribution amounts, while actuarial gains on assets and liabilities will lead to lower contribution amounts.

Impact of Plan Maturity on Risk

For newer pension plans, most of the participants and associated liabilities are related to active members who have not yet reached retirement age. As pension plans continue in operation and active members reach retirement ages, liabilities begin to shift from being primarily related to active members to being shared amongst active and retired members. Plan maturity is a measure of the extent to which this shift has occurred. It is important to understand that plan maturity can have an impact on risk tolerance and the overall risk characteristics of the plan. For example, plans with a large amount of retired liability do not have as long of a time horizon to recover from losses (such as losses on investments due to lower than expected investment returns) as plans where the majority of the liability is attributable to active members. For this reason, less tolerance for investment risk may be warranted for highly mature plans with a substantial inactive liability. Similarly, mature plans paying substantial retirement benefits resulting in a small positive or net negative cash flow can be more sensitive to near term investment volatility, particularly if the size of the fund is shrinking, which can result in less assets being available for investment in the market.

To assist with determining the maturity of the plan, we have provided some relevant metrics in table following titled “Plan Maturity Measures and Other Risk Metrics”. Highlights of this information are discussed below:

- The Support Ratio, determined as the ratio of active to inactive members has decreased from 81.0% to 77.8% over the last four years, meaning the plan’s maturity has remained consistent.
- The Accrued Liability Ratio, determined as the ratio of the Inactive Accrued Liability, which is the accrued liability associated with those receiving payments to the Total Accrued Liability, is 67.1%. With a plan of this maturity, losses due to lower than expected investment returns or demographic factors will need to be made up for over a shorter time horizon than would be needed for a less mature plan.
- The Funded Ratio, determined as the ratio of the Actuarial Value of Assets to the Total Accrued Liability has decreased from 46.6% on January 1, 2016 to 48.5% on January 1, 2019 due mainly to favorable plan experience.

It is important to note that the actuary has identified the risks above as the most significant risks based on the characteristics of the plan and the nature of the project, however, it is not an exhaustive list of potential risks that could be considered. Additional advanced modelling, as well as the identification of additional risks, can be provided at the request of the reader.

PLAN MATURITY MEASURES AND OTHER RISK METRICS

	<u>1/1/2016</u>	<u>1/1/2017</u>	<u>1/1/2018</u>	<u>1/1/2019</u>
<u>Support Ratio</u>				
Total Actives	158	165	163	158
Total Inactives	195	194	199	203
Actives / Inactives	81.0%	85.1%	81.9%	77.8%
 <u>Asset Volatility Ratio</u>				
Market Value of Assets (MVA)	98,558,838	106,191,547	121,629,667	116,755,057
Total Annual Payroll	14,364,290	15,343,727	15,614,913	15,747,659
MVA / Total Annual Payroll	686.1%	692.1%	778.9%	741.4%
 <u>Accrued Liability (AL) Ratio</u>				
Inactive Accrued Liability	148,274,204	151,850,046	159,027,866	169,488,430
Total Accrued Liability	213,710,492	227,820,272	237,625,062	252,477,972
Inactive AL / Total AL	69.4%	66.7%	66.9%	67.1%
 <u>Funded Ratio</u>				
Actuarial Value of Assets (AVA)	99,623,717	106,910,133	115,898,879	122,344,568
Total Accrued Liability	213,710,492	227,820,272	237,625,062	252,477,972
AVA / Total Accrued Liability	46.6%	46.9%	48.8%	48.5%

STATEMENT OF FIDUCIARY NET POSITION
December 31, 2018

<u>ASSETS</u>	MARKET VALUE
Cash and Cash Equivalents:	
Money Market	3,431,065
Total Cash and Equivalents	3,431,065
Receivables:	
From City	48,185
Accrued Past Due Interest	251,536
Total Receivable	299,721
Investments:	
Corporate Bonds	14,285,088
U.S. Gov't and Agency Obligations	25,184,766
Stocks	28,666,273
Mutual Funds	44,888,144
Total Investments	113,024,271
Total Assets	116,755,057
<u>LIABILITIES</u>	
Total Liabilities	0
Net Assets:	
Active and Retired Members' Equity	116,755,057
NET POSITION RESTRICTED FOR PENSIONS	116,755,057
TOTAL LIABILITIES AND NET ASSETS	116,755,057

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION
FOR THE YEAR ENDED December 31, 2018
Market Value Basis

ADDITIONS

Contributions:

Member	1,570,309
City	10,462,704

Total Contributions	12,033,013
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Investment Income:

Net Realized Gain (Loss)	1,651,470
Unrealized Gain (Loss)	(9,256,778)
Net Increase in Fair Value of Investments	(7,605,308)
Interest & Dividends	2,986,387
Less Investment Expense ¹	(292,132)

Net Investment Income	(4,911,053)
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Total Additions	7,121,960
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DEDUCTIONS

Distributions to Members:

Benefit Payments	11,937,685
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Total Distributions	11,937,685
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Administrative Expenses	58,885
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Total Deductions	11,996,570
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Net Increase in Net Position	(4,874,610)
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NET POSITION RESTRICTED FOR PENSIONS

Beginning of the Year	121,629,667
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End of the Year	116,755,057
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¹ Investment Related expenses include investment advisory, custodial and performance monitoring fees.

ACTUARIAL ASSET VALUATION

December 31, 2018

Actuarial Assets for funding purposes are developed by recognizing the total actuarial investment gain or loss for each Plan Year over a five year period. In the first year, 20% of the gain or loss is recognized. In the second year 40%, in the third year 60%, in the fourth year 80%, and in the fifth year 100% of the gain or loss is recognized. The actuarial investment gain or loss is defined as the actual return on investments minus the actuarial assumed investment return. Actuarial Assets shall not be less than 80% nor greater than 120% of the Market Value of Assets.

Plan Year Ending	Gain/(Loss)	Gains/(Losses) Not Yet Recognized				
		Amounts Not Yet Recognized by Valuation Year				
		2019	2020	2021	2022	2023
12/31/2015	(5,955,336)	(1,191,067)	0	0	0	0
12/31/2016	1,135,676	454,270	227,135	0	0	0
12/31/2017	8,597,538	5,158,523	3,439,015	1,719,508	0	0
12/31/2018	(12,514,046)	(10,011,237)	(7,508,428)	(5,005,618)	(2,502,809)	0
Total		(5,589,511)	(3,842,278)	(3,286,110)	(2,502,809)	0

Development of Investment Gain/Loss

Market Value of Assets, 12/31/2017	121,629,667
Contributions Less Benefit Payments & Administrative Expenses	36,443
Expected Investment Earnings ¹	7,602,993
Actual Net Investment Earnings	<u>(4,911,053)</u>
2018 Actuarial Investment Gain/(Loss)	(12,514,046)

¹ Expected Investment Earnings = 6.25% x (121,629,667 + 0.5 x 36,443)

Development of Actuarial Value of Assets

Market Value of Assets, 12/31/2018	116,755,057
(Gains)/Losses Not Yet Recognized	<u>5,589,511</u>
Actuarial Value of Assets, 12/31/2018	122,344,568
(A) 12/31/2017 Actuarial Assets:	115,898,879
(I) Net Investment Income:	
1. Interest and Dividends	2,986,387
2. Realized Gains (Losses)	1,651,470
3. Change in Actuarial Value	2,063,521
4. Investment Expenses	<u>(292,132)</u>
Total	6,409,246
(B) 12/31/2018 Actuarial Assets:	122,344,568
Actuarial Asset Rate of Return = (2 x I) / (A + B - I):	5.53%
Market Value of Assets Rate of Return:	-4.04%
12/31/2018 Limited Actuarial Assets:	122,344,568
Actuarial Gain/(Loss) due to Investment Return (Actuarial Asset Basis)	(835,573)

CHANGES IN NET ASSETS AVAILABLE FOR BENEFITS
December 31, 2018
Actuarial Asset Basis

INCOME		
Contributions:		
Member	1,570,309	
City	10,462,704	
Total Contributions		12,033,013
Earnings from Investments		
Interest & Dividends	2,986,387	
Net Realized Gain (Loss)	1,651,470	
Change in Actuarial Value	2,063,521	
Total Earnings and Investment Gains		6,701,378
EXPENSES		
Administrative Expenses:		
Investment Related ¹	292,132	
Other	58,885	
Total Administrative Expenses		351,017
Distributions to Members:		
Benefit Payments	11,937,685	
Total Distributions		11,937,685
Change in Net Assets for the Year		6,445,689
Net Assets Beginning of the Year		115,898,879
Net Assets End of the Year ²		122,344,568

¹ Investment Related expenses include investment advisory, custodial and performance monitoring fees.

² Net Assets may be limited for actuarial consideration.

STATISTICAL DATA

	<u>1/1/2016</u>	<u>1/1/2017</u>	<u>1/1/2018</u>	<u>1/1/2019</u>
<u>Actives - Tier 1</u>				
Number	124	123	117	111
Average Current Age	41.9	42.8	43.3	43.7
Average Age at Employment	28.3	28.2	28.3	28.1
Average Past Service	13.6	14.6	15.0	15.6
Average Annual Salary	\$96,458	\$99,810	\$102,843	\$107,090
<u>Actives - Tier 2</u>				
Number	34	42	46	47
Average Current Age	29.4	30.2	31.0	32.1
Average Age at Employment	27.2	27.8	28.0	28.3
Average Past Service	2.2	2.4	3.0	3.8
Average Annual Salary	\$70,692	\$73,027	\$77,875	\$82,142
<u>Service Retirees</u>				
Number	135	131	134	137
Average Current Age	68.7	69.2	69.8	70.0
Average Annual Benefit	\$66,878	\$69,479	\$71,838	\$74,334
<u>Beneficiaries</u>				
Number	28	30	30	28
Average Current Age	76.5	77.1	77.7	78.4
Average Annual Benefit	\$36,388	\$36,343	\$36,620	\$37,595
<u>Disability Retirees</u>				
Number	16	16	17	18
Average Current Age	60.8	61.8	61.1	62.4
Average Annual Benefit	\$40,691	\$41,103	\$43,224	\$44,999
<u>Terminated Vested</u>				
Number	16	17	18	20
Average Current Age	40.9	41.0	41.5	41.3
Average Annual Benefit ¹	\$24,178	\$24,178	\$24,178	\$24,178

¹ Average Annual Benefit for Terminated Vested members reflects the benefit for members entitled to a future annual benefit from the plan.

AGE AND SERVICE DISTRIBUTION

PAST SERVICE

AGE	0	1	2	3	4	5-9	10-14	15-19	20-24	25-29	30+	Total
15 - 19	0	0	0	0	0	0	0	0	0	0	0	0
20 - 24	0	0	0	0	0	0	0	0	0	0	0	0
25 - 29	2	1	2	0	7	0	0	0	0	0	0	12
30 - 34	0	2	5	2	4	11	5	0	0	0	0	29
35 - 39	1	0	3	0	0	12	19	7	0	0	0	42
40 - 44	0	0	0	0	0	3	12	13	0	0	0	28
45 - 49	1	0	0	0	0	1	5	9	7	0	0	23
50 - 54	0	0	0	0	0	0	1	6	4	5	0	16
55 - 59	0	0	0	0	0	0	0	0	0	5	0	5
60 - 64	0	0	0	0	0	0	1	1	0	1	0	3
65+	0	0	0	0	0	0	0	0	0	0	0	0
Total	4	3	10	2	11	27	43	36	11	11	0	158

VALUATION PARTICIPANT RECONCILIATION

1. Active lives

a. Number in prior valuation 1/1/2018	163
b. Terminations	
i. Vested (partial or full) with deferred benefits	(2)
ii. Non-vested or full lump sum distribution received	(1)
iii. Transferred service to other fund	0
c. Deaths	
i. Beneficiary receiving benefits	0
ii. No future benefits payable	0
d. Disabled	(1)
e. Retired	(5)
f. Continuing participants	154
g. New entrants	<u>4</u>
h. Total active life participants in valuation	158

2. Non-Active lives (including beneficiaries receiving benefits)

	Service Retirees, Vested Receiving <u>Benefits</u>	Receiving Death <u>Benefits</u>	Receiving Disability <u>Benefits</u>	Vested <u>Deferred</u>	<u>Total</u>
a. Number prior valuation	134	30	17	18	199
Retired	5	0	0	0	5
Vested Deferred	0	0	0	2	2
Death, With Survivor	(1)	1	0	0	0
Death, No Survivor	(1)	(2)	0	0	(3)
Disabled	0	0	1	0	1
Refund of Contributions	0	(1)	0	0	(1)
Rehires	0	0	0	0	0
Expired Annuities	0	0	0	0	0
Data Corrections	0	0	0	0	0
Hired/Termed in Same Year	0	0	0	0	0
b. Number current valuation	137	28	18	20	203

SUMMARY OF CURRENT PLAN

Article 3 Pension Fund

The Plan is established and administered as prescribed by “Article 3. Police Pension Fund – Municipalities 500,000 and Under” of the Illinois Pension Code.

Plan Administration

The Plan is a single employer defined benefit pension plan administered by a Board of Trustees comprised of:

- a) Two members appointed by the Municipality,
- b) Two active Members of the Police Department elected by the Membership, and
- c) One retired Member of the Police Department elected by the Membership.

Credited Service

Complete years of service as a sworn police officer employed by the Municipality.

Normal Retirement

Date

Tier 1: Age 50 and 20 years of Credited Service.

Tier 2: Age 55 with 10 years of Credited Service.

Benefit

Tier 1: 50% of annual salary attached to rank on last day of service plus 2.50% of annual salary for each year of service over 20 years, up to a maximum of 75% of salary. The minimum monthly benefit is \$1,000 per month.

Tier 2: 2.50% per year of service times the average salary for the eight consecutive years prior to retirement times the number of years of service, up to a maximum of 75% of average salary. The minimum monthly benefit is \$1,000 per month.

Form of Benefit

Tier 1: For married retirees, an annuity payable for the life of the Member; upon the death of the member, 100% of the Member's benefit payable to the spouse until death. For unmarried retirees, the normal form is a Single Life Annuity.

Tier 2: Same as above, but with 66 2/3% of benefit continued to spouse.

Early Retirement

Date

Tier 1: Age 60 and 8 years of Credited Service.

Tier 2: Age 50 with 10 years of Credited Service.

Benefit

Tier 1: Normal Retirement benefit with no minimum.

Tier 2: Normal Retirement benefit, reduced 6% each year before age 55, with no minimum benefit.

Form of Benefit

Same as Normal Retirement.

Disability Benefit

Eligibility Total and permanent as determined by the Board of Trustees.

Benefit Amount A maximum of:

- a.) 65% of salary attached to the rank held by Member on last day of service, and;
- b.) The monthly retirement pension that the Member is entitled to receive if he or she retired immediately.

For non-service connected disabilities, a benefit of 50% of salary attached to rank held by Member on last day of service.

Cost-of-Living Adjustment

Tier 1:

Retirees: An annual increase equal to 3.00% per year after age 55. Those that retire prior to age 55 receive an increase of 1/12 of 3.00% for each full month since benefit commencement upon reaching age 55.

Disabled Retirees: An annual increase equal to 3.00% per year of the original benefit amount beginning at age 60. Those that become disabled prior to age 60 receive an increase of 3.00% of the original benefit amount for each year since benefit commencement upon reaching age 60.

Tier 2: An annual increase each January 1 equal to 3.00% per year or one-half of the annual unadjusted percentage increase in the consumer price index-u for the 12 months ending with the September preceding each November 1, whichever is less, of the original pension after the attainment of age 60 or first anniversary of pension start date whichever is later.

Pre-Retirement Death Benefit

Service Incurred 100% of salary attached to rank held by Member on last day of service.

Non-Service Incurred A maximum of:

- a.) 50% of salary attached to the rank held by Member on last day of service, and;
- b.) The monthly retirement pension earned by the deceased Member at the time of death, regardless of whether death occurs before or after age 50.

For non-service deaths with less than 10 years of service, a refund of member contributions is provided.

