CITY OF ROCHELLE
FIREFIGHTERS' 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 1, 2019

Board of Trustees
c/o Ms. Chris Cardott, Finance Director / Treasurer
City of Rochelle
420 N. 6th Street
Rochelle, IL 61068

Re: Actuarial Valuation Report – City of Rochelle Firefighters' Pension Fund

Dear Board:

We are pleased to present to the Board this report of the annual actuarial valuation of the City of Rochelle Firefighters' 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 4, 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 Rochelle, nor does anyone at Foster & Foster, Inc. act as a member of the Board of Trustees of the City of Rochelle Firefighters' 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

Jason L. Franken, FSA, EA, MAAA

By: Heidi Andorfer

Heidi E. Andorfer, FSA, EA, MAAA

By: Paul M. Baugher

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Enclosures

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SUMMARY OF REPORT

The regular annual actuarial valuation of the City of Rochelle Firefighters' 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	12/31/2020	12/31/2019
Total Recommended Contribution	$680,047	$636,823
% of Projected Annual Payroll	66.8%	62.2%
Member Contributions (Est.)	96,293	96,830
% of Projected Annual Payroll	9.5%	9.5%
City Recommended Contribution	583,754	539,993
% of Projected Annual Payroll	57.3%	52.7%

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 with this valuation.

Plan experience was unfavorable overall on the basis of the plan's actuarial assumptions. Sources of unfavorable experience included an investment return of 4.21% (Actuarial Asset Basis) which fell short of the 6.50% assumption, lower than expected inactive mortality, and more retirements than expected. These losses were offset in part by a gain associated with higher turnover than expected.

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-2010 tables.

There were no method changes since the prior valuation.

COMPARATIVE SUMMARY OF PRINCIPAL VALUATION RESULTS

	New Assump 1/1/2019	Old Assump 1/1/2019	1/1/2018
A. Participant Data			
Number Included			
Actives	13	13	13
Service Retirees	10	10	9
Beneficiaries	0	0	0
Disability Retirees	1	1	1
Terminated Vested	1	1	1
Total	25	25	24
Total Annual Payroll	$1,018,430	$1,018,430	$1,024,117
Payroll Under Assumed Ret. Age	1,018,430	1,018,430	1,024,117
Annual Rate of Payments to:			
Service Retirees	651,735	651,735	579,733
Beneficiaries	0	0	0
Disability Retirees	32,594	32,594	32,093
Terminated Vested	0	0	0
B. Assets			
Actuarial Value	9,104,647	9,104,647	8,925,845
Market Value	8,495,037	8,495,037	8,938,461
C. Liabilities			
Present Value of Benefits			
Actives			
Retirement Benefits	6,112,099	5,836,303	6,598,490
Disability Benefits	834,863	727,220	729,340
Death Benefits	86,449	187,465	194,976
Vested Benefits	371,207	361,468	322,910
Service Retirees	10,313,888	9,936,062	8,876,108
Beneficiaries	0	0	0
Disability Retirees	367,930	335,172	337,569
Terminated Vested	37,425	37,425	37,425
Total	18,123,861	17,421,115	17,096,818

C. Liabilities - (Continued)	New Assump 1/1/2019	Old Assump 1/1/2019	1/1/2018
Present Value of Future Salaries	13,596,739	13,510,600	12,100,014
Present Value of Future Member Contributions	1,285,572	1,277,427	1,144,056
Normal Cost (Retirement)	197,427	188,875	212,551
Normal Cost (Disability)	40,674	35,692	40,390
Normal Cost (Death)	5,073	9,350	10,711
Normal Cost (Vesting)	20,439	20,005	17,310
Total Normal Cost	263,613	253,922	280,962
Present Value of Future Normal Costs	3,163,689	3,028,172	3,018,283
Accrued Liability (Retirement)	3,701,177	3,544,693	4,276,193
Accrued Liability (Disability)	329,559	286,334	301,024
Accrued Liability (Death)	22,979	70,856	78,797
Accrued Liability (Vesting)	187,214	182,401	171,419
Accrued Liability (Inactives)	10,719,243	10,308,659	9,251,102
Total Actuarial Accrued Liability	14,960,172	14,392,943	14,078,535
Unfunded Actuarial Accrued Liability (UAAL)	5,855,525	5,288,296	5,152,690
Funded Ratio (AVA / AL)	60.9%	63.3%	63.4%

	New Assump 1/1/2019	Old Assump 1/1/2019	1/1/2018
D. Actuarial Present Value of Accrued Benefits			
Vested Accrued Benefits			
Inactives	10,719,243	10,308,659	9,251,102
Actives	1,137,253	1,070,619	1,841,455
Member Contributions	793,861	793,861	898,743
Total	12,650,357	12,173,139	11,991,300
Non-vested Accrued Benefits	331,421	320,996	104,767
Total Present Value Accrued Benefits	12,981,778	12,494,135	12,096,067
Funded Ratio (MVA / PVAB)	65.4%	68.0%	73.9%
Increase (Decrease) in Present Value of Accrued Benefits Attributable to:			
Plan Amendments	0	0	
Assumption Changes	487,643	0	
New Accrued Benefits	0	372,933	
Benefits Paid	0	(737,152)	
Interest	0	762,287	
Other	0	0	
Total	487,643	398,068	

Valuation Date Applicable to Fiscal Year Ending	New Assump 1/1/2019 12/31/2020	Old Assump 1/1/2019 12/31/2020	1/1/2018 12/31/2019
E. Pension Cost			
Normal Cost [1]	$280,748	$270,427	$299,225
% of Total Annual Payroll [1]	27.6	26.6	29.2
Administrative Expenses [1]	22,875	22,875	16,687
% of Total Annual Payroll [1]	2.2	2.2	1.6
Payment Required to Amortize Unfunded Actuarial Accrued Liability over 22 years (as of 1/1/2019) [1]	376,424	339,960	320,911
% of Total Annual Payroll [1]	37.0	33.4	31.4
Total Recommended Contribution	680,047	633,262	636,823
% of Total Annual Payroll [1]	66.8	62.2	62.2
Expected Member Contributions [1]	96,293	96,293	96,830
% of Total Annual Payroll [1]	9.5	9.5	9.5
Expected City Contribution	583,754	536,969	539,993
% of Total Annual Payroll [1]	57.3	52.7	52.7

F. Past Contributions

Plan Years Ending:	12/31/2018
Total Recommended Contribution	633,563
City	531,650
Actual Contributions Made:	
Members (excluding buyback)	101,913
City	463,931
Total	565,844

G. Net Actuarial (Gain)/Loss 67,411

[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:

Year	Projected Unfunded Accrued Liability
2019	5,855,525
2020	5,859,710
2021	5,850,992
2026	5,564,687
2031	4,712,272
2036	2,997,882
2041	0

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

		Actual	Assumed
Year Ended	12/31/2018	6.79%	4.97%
Year Ended	12/31/2017	3.57%	6.05%
Year Ended	12/31/2016	4.31%	5.56%

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

		Actual	Assumed
Year Ended	12/31/2018	4.21%	6.50%
Year Ended	12/31/2017	5.41%	6.50%
Year Ended	12/31/2016	4.70%	6.50%

DEVELOPMENT OF JANUARY 1, 2019 AMORTIZATION PAYMENT

(1)	Unfunded Actuarial Accrued Liability as of January 1, 2018	$5,152,690
(2)	Sponsor Normal Cost developed as of January 1, 2018	184,132
(3)	Expected administrative expenses for the year ended December 31, 2018	15,669
(4)	Expected interest on (1), (2) and (3)	347,403
(5)	Sponsor contributions to the System during the year ended December 31, 2018	463,931
(6)	Expected interest on (5)	15,078
(7)	Expected Unfunded Actuarial Accrued Liability as of December 31, 2018, (1)+(2)+(3)+(4)-(5)-(6)	5,220,885
(8)	Change to UAAL due to Assumption Change	567,229
(9)	Change to UAAL due to Actuarial (Gain)/Loss	67,411
(10)	Unfunded Accrued Liability as of January 1, 2019	5,855,525
(11)	UAAL Subject to Amortization (100% AAL less Actuarial Assets)	5,855,525

Date Established	Years Remaining	1/1/2019 Amount	Amortization Amount
1/1/2019	22	5,855,525	353,450

DETAILED ACTUARIAL (GAIN)/LOSS ANALYSIS

(1)	Unfunded Actuarial Accrued Liability (UAAL) as of January 1, 2018	$5,152,690
(2)	Expected UAAL as of January 1, 2019	5,220,885
(3)	Summary of Actuarial (Gain)/Loss, by component:	
	Investment Return (Actuarial Asset Basis)	202,325
	Salary Increases	37,237
	Active Decrements	(362,510)
	Inactive Mortality	71,705
	Other	118,654
	Change in UAAL due to (Gain)/Loss	67,411
	Assumption Changes	567,229
(4)	Actual UAAL as of January 1, 2019	$5,855,525

RECONCILIATION OF CHANGES IN CONTRIBUTION REQUIREMENT

(1) Contribution Determined as of January 1, 2018	$539,993
(2) Summary of Contribution Impact by component:	
Change in Normal Cost	(28,798)
Change in Assumed Administrative Expense	6,188
Investment Return (Actuarial Asset Basis)	13,007
Salary Increases	2,394
New Entrants	-
Active Decrements	(23,304)
Inactive Mortality	4,610
Data Corrections	-
Contributions (More) or Less than Recommended	4,495
Increase in Amortization Payment Due to Payroll Growth Assumption	11,232
Change in Expected Member Contributions	537
Assumption Change	46,785
Other	6,615
Total Change in Contribution	43,761
(3) Contribution Determined as of January 1, 2019	$583,754

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.

	New Assump	Old Assump	
Valuation Date	1/1/2019	1/1/2019	1/1/2018
Applicable to Fiscal Year Ending	12/31/2020	12/31/2020	12/31/2019
Actuarial Accrued Liability (PUC)	14,567,960	14,015,087	13,748,896
Actuarial Value of Assets	9,104,647	9,104,647	8,925,845
Unfunded Actuarial Accrued Liability (UAAL)	5,463,313	4,910,440	4,823,051
UAAL Subject to Amortization	4,006,517	3,508,931	3,448,161
Normal Cost [1]	$279,272	$268,631	$290,799
% of Total Annual Payroll [1]	27.4	26.4	28.4
Administrative Expenses [1]	22,875	22,875	16,687
% of Total Annual Payroll [1]	2.2	2.2	1.6
Payment Required to Amortize Unfunded Actuarial Accrued Liability over 22 years (as of 1/1/2019) [1]	257,560	225,573	214,753
% of Total Annual Payroll [1]	25.4	22.2	21.0
Total Required Contribution	559,707	517,079	522,239
% of Total Annual Payroll [1]	55.0	50.8	51.0
Expected Member Contributions [1]	96,293	96,293	96,830
% of Total Annual Payroll [1]	9.5	9.5	9.5
Expected City Contribution	463,414	420,786	425,409
% of Total Annual Payroll [1]	45.5	41.3	41.5

Assumptions and Methods:

Actuarial Cost Method	Projected Unit Credit
Amortization Method	90% Funding by 2040

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	24,568	718,211	742,779
2020	45,312	698,538	743,850
2021	62,286	716,227	778,513
2022	75,737	733,762	809,499
2023	89,515	751,038	840,553
2024	101,306	767,927	869,233
2025	114,776	784,286	899,062
2026	141,422	799,941	941,363
2027	161,429	814,693	976,122
2028	183,256	828,315	1,011,571
2029	202,208	840,543	1,042,751
2030	231,869	851,087	1,082,956
2031	267,091	859,618	1,126,709
2032	301,224	865,781	1,167,005
2033	358,051	869,203	1,227,254
2034	410,225	869,492	1,279,717
2035	465,801	866,267	1,332,068
2036	527,180	859,179	1,386,359
2037	587,693	847,931	1,435,624
2038	650,997	832,286	1,483,283
2039	728,820	812,071	1,540,891
2040	792,575	787,186	1,579,761
2041	850,385	757,593	1,607,978
2042	948,693	723,360	1,672,053
2043	1,023,582	684,756	1,708,338
2044	1,088,612	642,317	1,730,929
2045	1,139,842	596,811	1,736,653
2046	1,211,691	549,160	1,760,851
2047	1,262,289	500,326	1,762,615
2048	1,307,768	451,204	1,758,972
2049	1,384,899	402,584	1,787,483
2050	1,429,748	355,207	1,784,955
2051	1,466,994	309,741	1,776,735
2052	1,499,278	266,771	1,766,049
2053	1,525,392	226,840	1,752,232
2054	1,548,564	190,408	1,738,972
2055	1,567,818	157,772	1,725,590
2056	1,583,920	129,030	1,712,950
2057	1,597,407	104,110	1,701,517
2058	1,607,049	82,827	1,689,876

ACTUARIAL ASSUMPTIONS AND METHODS

Interest Rate	6.50% per year compounded annually, net of investment related expenses. This is reasonable on a long-term basis and will continue to be monitored.
Mortality Rate	***Active Lives:*** PubS-2010 Employee mortality, projected 5 years past the valuation date with Scale MP-2018. 20% of active deaths are assumed to be in the line of duty. ***Inactive Lives:*** PubS-2010 Healthy Retiree mortality, projected 5 years past the valuation date with Scale MP-2018. ***Beneficiaries:*** PubS-2010 Survivor mortality, projected 5 years past the valuation date with Scale MP-2018. ***Disabled Lives:*** PubS-2010 Disabled mortality, projected 5 years past the valuation date with Scale MP-2018. The mortality assumptions sufficiently accommodate anticipated future mortality improvements.
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. 80% 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.

Salary Increases	See table below. This is based on a 2017 experience study performed for the State of Illinois Department of Insurance.

Salary Scale	
Service	Rate
0	12.50%
1	12.00%
2	10.00%
3	8.50%
4	7.50%
5	6.00%
6	4.50%
7-26	4.00%
27-30	3.75%
31+	3.50%

Inflation	2.50%.
Cost-of-Living Adjustment	Tier 1: 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. Tier 2: 1.25% per year after the later of attainment of age 60 or first anniversary of retirement.
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 100% of the Accrued Liability less the Actuarial Value of Assets.
Payroll Growth	3.50% per year.
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	
Age	Rate
20	7.00%
25	5.80%
30	3.50%
35	1.75%
40	1.10%
45	1.00%
50	1.00%
55+	0.00%

% Becoming Disabled During the Year	
Age	Rate
20	0.010%
25	0.016%
30	0.068%
35	0.220%
40	0.420%
45	0.650%
50	0.900%
55	1.240%
60	1.580%

% Retiring During the Year (Tier 1)	
Age	Rate
50-51	10%
52-53	12%
54-55	15%
56-59	20%
60-62	25%
63-64	33%
65-69	50%
70+	100%

% Retiring During the Year (Tier 2)	
Age	Rate
50-54	3%
55	30%
56-59	20%
60-62	25%
63-64	33%
65-69	50%
70+	100%

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 118.2% to 108.3% over the last four years, which is the effect of one member retiring.

- 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 71.7%. 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 61.8% on January 1, 2016 to 60.9% on January 1, 2019 due mainly to a change of actuarial assumptions. If the current assumptions accurately reflect future plan experience and City contributions are made as recommended, the funded ratio will increase over time.

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

	1/1/2016	1/1/2017	1/1/2018	1/1/2019
Support Ratio				
Total Actives	13	13	13	13
Total Inactives	11	11	11	12
Actives / Inactives	118.2%	118.2%	118.2%	108.3%
Asset Volatility Ratio				
Market Value of Assets (MVA)	7,867,783	8,153,424	8,938,461	8,495,037
Total Annual Payroll	941,440	988,823	1,024,117	1,018,430
MVA / Total Annual Payroll	835.7%	824.6%	872.8%	834.1%
Accrued Liability (AL) Ratio				
Inactive Accrued Liability	9,232,767	9,177,216	9,251,102	10,719,243
Total Accrued Liability	13,419,059	13,741,771	14,078,535	14,960,172
Inactive AL / Total AL	68.8%	66.8%	65.7%	71.7%
Funded Ratio				
Actuarial Value of Assets (AVA)	8,291,746	8,551,478	8,925,845	9,104,647
Total Accrued Liability	13,419,059	13,741,771	14,078,535	14,960,172
AVA / Total Accrued Liability	61.8%	62.2%	63.4%	60.9%

STATEMENT OF FIDUCIARY NET POSITION
December 31, 2018

ASSETS	MARKET VALUE
Cash and Cash Equivalents:	
Checking Account	22,234
Money Market	125,803
Total Cash and Equivalents	148,037
Receivables:	
Accrued Past Due Interest	31,080
Total Receivable	31,080
Investments:	
Municipal Obligations	703,272
Corporate Bonds	476,929
U.S. Gov't and Agency Obligations	3,555,205
Insurance Company Contracts	187,736
Mutual Funds	3,392,778
Total Investments	8,315,920
Total Assets	8,495,037
LIABILITIES	
Total Liabilities	0
Net Assets:	
Active and Retired Members' Equity	8,495,037
NET POSITION RESTRICTED FOR PENSIONS	8,495,037
TOTAL LIABILITIES AND NET ASSETS	8,495,037

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

ADDITIONS		
Contributions:		
Member	101,913	
City	463,931	
Total Contributions		565,844
Investment Income:		
Net Realized Gain (Loss)	29,282	
Unrealized Gain (Loss)	(606,719)	
Net Increase in Fair Value of Investments		(577,437)
Interest & Dividends		345,878
Less Investment Expense [1]		(19,078)
Net Investment Income		(250,637)
Total Additions		315,207
DEDUCTIONS		
Distributions to Members:		
Benefit Payments	656,143	
Refund of Contributions/Transfers	81,009	
Total Distributions		737,152
Administrative Expenses		21,479
Total Deductions		758,631
Net Increase in Net Position		(443,424)
NET POSITION RESTRICTED FOR PENSIONS		
Beginning of the Year		8,938,461
End of the Year		8,495,037

[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.

Gains/(Losses) Not Yet Recognized

Plan Year		Amounts Not Yet Recognized by Valuation Year				
Ending	Gain/(Loss)	2019	2020	2021	2022	2023
4/30/2015	27,280	1,819	0	0	0	0
4/30/2016	(504,080)	(134,422)	(33,605)	0	0	0
12/31/2016	(57,112)	(22,845)	(11,422)	0	0	0
12/31/2017	343,559	206,135	137,424	68,712	0	0
12/31/2018	(825,371)	(660,297)	(495,223)	(330,148)	(165,074)	0
Total		(609,610)	(402,826)	(261,436)	(165,074)	0

Development of Investment Gain/Loss

Market Value of Assets, 12/31/2017	8,938,461
Contributions Less Benefit Payments & Administrative Expenses	(192,787)
Expected Investment Earnings[1]	574,734
Actual Net Investment Earnings	(250,637)
2018 Actuarial Investment Gain/(Loss)	(825,371)

[1] Expected Investment Earnings = 6.50% x (8,938,461 + 0.5 x -192,787)

Development of Actuarial Value of Assets

Market Value of Assets, 12/31/2018	8,495,037
(Gains)/Losses Not Yet Recognized	609,610
Actuarial Value of Assets, 12/31/2018	9,104,647
(A) 12/31/2017 Actuarial Assets:	8,925,845
(I) Net Investment Income:	
1. Interest and Dividends	345,878
2. Realized Gains (Losses)	29,282
3. Change in Actuarial Value	15,507
4. Investment Expenses	(19,078)
Total	371,589
(B) 12/31/2018 Actuarial Assets:	9,104,647
Actuarial Asset Rate of Return = (2 x I) / (A + B - I):	4.21%
Market Value of Assets Rate of Return:	-2.83%
12/31/2018 Limited Actuarial Assets:	9,104,647
Actuarial Gain/(Loss) due to Investment Return (Actuarial Asset Basis)	(202,325)

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

INCOME		
Contributions:		
Member	101,913	
City	463,931	
Total Contributions		565,844
Earnings from Investments		
Interest & Dividends	345,878	
Net Realized Gain (Loss)	29,282	
Change in Actuarial Value	15,507	
Total Earnings and Investment Gains		390,667
EXPENSES		
Administrative Expenses:		
Investment Related[1]	19,078	
Other	21,479	
Total Administrative Expenses		40,557
Distributions to Members:		
Benefit Payments	656,143	
Refund of Contributions/Transfers	81,009	
Total Distributions		737,152
Change in Net Assets for the Year		178,802
Net Assets Beginning of the Year		8,925,845
Net Assets End of the Year[2]		9,104,647

[1] Investment Related expenses include investment advisory, custodial and performance monitoring fees.
[2] Net Assets may be limited for actuarial consideration.

STATISTICAL DATA

	1/1/2016	1/1/2017	1/1/2018	1/1/2019
Actives - Tier 1				
Number	9	9	9	7
Average Current Age	41.6	42.3	43.3	42.1
Average Age at Employment	27.5	27.5	27.5	25.8
Average Past Service	14.1	14.8	15.8	16.3
Average Annual Salary	$79,815	$82,505	$85,185	$90,824
Actives - Tier 2				
Number	4	4	4	6
Average Current Age	28.9	29.6	30.6	29.4
Average Age at Employment	26.4	26.6	26.0	25.6
Average Past Service	2.5	3.0	4.6	3.8
Average Annual Salary	$55,777	$61,570	$64,364	$63,777
Service Retirees				
Number	9	9	9	10
Average Current Age	64.6	65.2	66.2	66.3
Average Annual Benefit	$62,308	$62,539	$64,415	$65,174
Beneficiaries				
Number	0	0	0	0
Average Current Age	N/A	N/A	N/A	N/A
Average Annual Benefit	N/A	N/A	N/A	N/A
Disability Retirees				
Number	1	1	1	1
Average Current Age	71.5	72.2	73.2	74.2
Average Annual Benefit	$31,596	$31,596	$32,093	$32,594
Terminated Vested				
Number	1	1	1	1
Average Current Age	38.0	38.7	39.7	40.7
Average Annual Benefit [1]	N/A	N/A	N/A	N/A

[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	0	0	0	0	1	0	0	0	0	0	3
30 - 34	0	0	0	0	0	2	0	0	0	0	0	2
35 - 39	0	0	1	0	0	0	3	0	0	0	0	4
40 - 44	0	0	0	0	0	1	0	2	0	0	0	3
45 - 49	0	0	0	0	0	0	0	0	0	0	0	0
50 - 54	0	0	0	0	0	0	0	0	0	0	0	0
55 - 59	0	0	0	0	0	0	0	0	0	0	1	1
60 - 64	0	0	0	0	0	0	0	0	0	0	0	0
65+	0	0	0	0	0	0	0	0	0	0	0	0
Total	2	0	1	0	0	4	3	2	0	0	1	13

VALUATION PARTICIPANT RECONCILIATION

1. Active lives

a. Number in prior valuation 1/1/2018	13
b. Terminations	
i. Vested (partial or full) with deferred benefits	0
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	0
e. Retired	(1)
f. Continuing participants	11
g. New entrants	2
h. Total active life participants in valuation	13

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

	Service Retirees, Vested Receiving Benefits	Receiving Death Benefits	Receiving Disability Benefits	Vested Deferred	Total
a. Number prior valuation	9	0	1	1	11
Retired	1	0	0	0	1
Vested Deferred	0	0	0	0	0
Death, With Survivor	0	0	0	0	0
Death, No Survivor	0	0	0	0	0
Disabled	0	0	0	0	0
Refund of Contributions	0	0	0	0	0
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	10	0	1	1	12

SUMMARY OF CURRENT PLAN

Article 4 Pension Fund	The Plan is established and administered as prescribed by "Article 4. Firefighters' Pension Fund – Municipalities 500,000 and Under" of the Illinois Pension Code.
Plan Administration	The Plan is administered by a Board of Trustees comprised of: a) Two members appointed by the Municipality, b) Two active Members of the Fire Department elected by the Membership, and c) One retired Member of the Fire Department elected by the Membership.
Credited Service	Years and fractional parts of years of service (except as noted below) as a sworn Firefighter employed by the Municipality.
Salary	Annual salary, including longevity, attached to firefighter's rank, as established by the municipality appropriation ordinance, excluding overtime pay, bonus pay and holiday pay except for the base 8 hours of the 10 pensionable holidays which is included.
Normal Retirement	
Date	**Tier 1**: Age 50 and 20 years of Credited Service. **Tier 2:** Age 55 and 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 $1,159.27 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 $1,159.27 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 10 years of Credited Service. **Tier 2:** Age 50 and 10 years of Credited Service.
Benefit	**Tier 1**: 1.5% plus 0.1% for each year of service in excess of 10 years, times salary x service (complete years). **Tier 2**: Normal Retirement Benefit, reduced 6% for 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. Seven years of service required for non-service connected disability.
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.) 54% 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.

Vesting (Termination)

Vesting Service Requirement	10 years.
Non-Vested Benefit	Refund of Member Contributions.
Vested Benefit	Either the termination benefit, payable upon reaching age 60 (55 for Tier 2), provided contributions are not withdrawn, or a refund of member contributions.
Termination Benefit	Based on the monthly salary attached to the Member's rank at separation from service and equals: **Tier 1:** 1.5% plus 0.1% for each year of service in excess of 10 years, times salary x service (based on complete years). **Tier 2:** 2.50% of 8-year final average salary times creditable service.

Contributions

Employee	9.455% of Salary.
Municipality	Remaining amount necessary for payment of Normal (current year's) Cost and amortization of the accrued past service liability.