Firemen's Annuity and Benefit Fund of Chicago

Actuarial Valuation Report as of December 31, 2018

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May 24, 2019

Retirement Board of the
Firemen's Annuity and Benefit Fund of Chicago
20 South Clark Street, Suite 1400
Chicago, Illinois 60603-1899

Subject: Actuarial Valuation Report for the Year Ending December 31, 2018

Dear Members of the Board:

At your request, we have performed an actuarial valuation for the Firemen's Annuity and Benefit Fund of Chicago ("the FABF" or "the Fund") as of December 31, 2018. The primary purposes of this actuarial valuation are to determine the statutory contribution for tax levy year 2020 (i.e., payment year 2021) and to measure the funding status of the Fund as of December 31, 2018, based on the statutes in effect as of December 31, 2018. This report also provides the development of the plan year end 2019 Actuarially Determined Contribution ("ADC") as required by GASB Statement Nos. 67 and 68. Other information required under GASB Statement Nos. 67 and 68 is provided in a separate report. The actuarial assumptions and methods used were recommended by the actuary and approved by the Board.

We have prepared supporting schedules for the actuarial section of the comprehensive annual financial report, including:

- Summary of Actuarial Valuation Methods and Assumptions;
- Schedule of Active Member Data;
- Retirements and Beneficiaries Added to and Removed from Rolls;
- Solvency (Termination) Test;
- Development of Actuarially Determined Contributions under GASB Statement Nos. 67 and 68;
- Development of Actuarial Gains and Losses; and
- Summary of Basic Actuarial Values.

This actuarial valuation is based upon:

a) **Data relative to the Members of the Fund –** Data for active members and persons receiving benefits from the Fund was provided by the Fund's staff. We have tested this data for reasonableness.

b) **Asset Values** – The value of assets of the Fund were provided by the Fund's staff. The assets provided by the Fund are still in draft form. The Fund and their auditor do not anticipate a material change in the asset value. The actuarial value of assets was used to develop actuarial results for the determination of statutory contribution requirements. In each fiscal year, asset gains and losses are phased in over a five-year period.

c) **Actuarial Method –** The actuarial method utilized by the Fund, as required by statute, is the Entry-Age Normal cost method. The objective of this method is to recognize the costs of Fund benefits over the entire career of each member as a level percentage of compensation. Any Unfunded Actuarial Accrued Liability (UAAL) under this method is separately financed. All actuarial gains and losses under this method are reflected in the UAAL.

d) **Actuarial Assumptions –** Based on the recommendations included in the Economic Assumption Review, updated economic actuarial assumptions have been adopted by the Board effective beginning with this actuarial valuation as of December 31, 2018. Key economic actuarial assumption changes include decreasing the discount rate and investment return assumption from 7.50% to 6.75%, decreasing the wage inflation rate from 3.75% to 3.50%, and decreasing the general inflation rate from 2.50% to 2.25%. The demographic actuarial assumptions remain unchanged from the prior actuarial valuation and reflect the results of the experience study performed for the period from January 1, 2012 to December 31, 2016. The actuarial assumptions used are set forth in Appendix 4: Actuarial Methods and Assumptions of this actuarial valuation report.

e) **Plan Provisions –** The actuarial valuation is based on plan provisions and statutes in effect as of December 31, 2018.

The funding objective is to provide employer and employee contributions sufficient to provide the benefits of the Fund when due. Pursuant to Public Act ("P.A.") 99-0506, effective May 30, 2016, the funding policy was amended and requires City contributions to be equal to $199 million in payment year 2016, $208 million in payment year 2017, $227 million in payment year 2018, $235 million in payment year 2019 and $245 million in payment year 2020. For payment years after 2020, the City is required to make level percent of pay contributions for plan years 2020 through 2055 that, along with member contributions and investment earnings, are expected to generate a projected funded ratio of 90% by plan year end 2055. The projections are based on an open group, level percent of pay financing and the Entry-Age Normal cost method.

This is a severely underfunded plan. The funded ratio is only 16.8% (using market value of assets) and the unfunded liability is approximately $5.1 billion as of December 31, 2018. The funded ratio is not projected to even reach 50% funded for another 26 years until 2044. The ratio of assets as of December 31, 2018, to expected benefit payments for plan year 2019 is only 2.97.

The funding policy defined in P.A. 99-0506 significantly defers contributions when compared to the provisions of the prior funding policy defined in P.A. 96-1495. The amount of annual contributions defined under P.A. 99-0506 does not even cover normal cost plus interest on the unfunded liability for the next 13 years. This means the unfunded liability is actually projected to increase to a high of $5.6 billion in 2027, when contributions are finally sufficient to start reducing the unfunded liability.

We understand that P.A. 99-0506 defines the amount of City Contributions to the FABF. Nevertheless, we continue to recommend that the plan sponsor seriously consider making additional contributions (in excess of the statutory requirement) to ensure that there are sufficient assets available in the fund in all years to pay the promised benefits.

We also recommend that the Board perform projections which include pessimistic scenarios such as investment return lower than assumed, lower contributions received than expected, higher benefit payments than expected, etc., to more fully understand the impact of less than optimal future expectations.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Appendix 4 of this report. This report includes risk metrics on page 14 but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this report.

This actuarial valuation assumes that the City will be able to make future contributions on a timely basis. We did not perform an analysis of the ability of the City to make future contributions. Such an analysis is not within the scope of our assignment or within our analytical skill set. Failure to receive City contributions on a timely basis could jeopardize the sustainability of the Fund.

The funding actuarial valuation results contained in this report were prepared based on the statutes in effect as of December 31, 2018. The projected contributions contained in this report will be used to develop the blended discount rate under GASB Statement Nos. 67 and 68.

The actuarial valuation results set forth in this report are based on the data and actuarial techniques described above, and upon the provisions of the Fund as of the actuarial valuation date. To the best of our knowledge, this actuarial statement is complete and accurate based on the statutes in effect as of December 31, 2018, and fairly presents the actuarial position of the Fund as of December 31, 2018. Based on these items, we certify these results to be true and correct.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law.

Actuarial valuations do not affect the ultimate cost of the Plan, only the timing of contributions into the Plan. Plan funding occurs over time. Contribution shortfalls (the difference between the actual contributions and the annual required contributions) remain the responsibility of the Plan sponsor. If the contribution levels over a period of years are lower or higher than necessary, it is normal and expected practice for adjustments to be made to future contribution levels to take account of this variance, with a view to funding the plan over time.

This report should not be relied on for any purpose other than the purpose stated.

This report was prepared at the request of the Board and is intended for use by the Fund and those designated or approved by the Board. This report may be provided to parties other than the Fund only in its entirety and only with the permission of the Fund. GRS is not responsible for unauthorized use of this report.

Alex Rivera and Lance J. Weiss are Members of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.

The signing actuaries are independent of the plan sponsor.

Respectfully submitted,

Gabriel, Roeder, Smith & Company

Alex Rivera

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Appendix 3 (Cont'd)

Summary of Valuation Results

This report sets forth the results of the actuarial valuation of the Firemen's Annuity and Benefit Fund of the City of Chicago ("FABF" or "Fund") as of December 31, 2018. This actuarial valuation is based on the statutes in effect as of December 31, 2018. The purposes of this actuarial valuation are:

1. To provide the projected statutory contributions for tax levy year 2020 (i.e., payment year 2021) based on the funding provisions of Public Act 99-0506.
2. To estimate the projected statutory contributions for tax levy years after 2020 based on the funding provisions of Public Act 99-0506, for purposes of developing the blended discount rate under GASB Statement Nos. 67 and 68.
3. To develop the actuarially determined contributions (ADC) under GASB Statement Nos. 67 and 68 for plan year 2019.
4. To review the funded status of the Fund as of December 31, 2018, based on the statutes in effect as of the actuarial valuation date.

The funded status, in basic terms, is a comparison of the Fund's liabilities to assets expressed as either an unfunded liability or as a ratio of assets to liabilities. This comparison can be measured in various ways. Fund liabilities are dependent on the actuarial assumptions and actuarial cost method. Fund assets can be measured at market value, book value or some variation to smooth the fluctuations that invariably occur from year to year.

Funded status is measured differently for statutory funding and for Fund and City financial reports. The following chart shows how funded status is determined for each purpose.

Purpose	Actuarial Method	Asset Value
Statutory Funding	Entry-Age Normal	Actuarial (Market-Related) Value of Assets
Fund reporting after 2014 (GASB #67 for pension benefits)	Entry-Age Normal	Market Value of Assets
City reporting after 2015 (GASB #68 for pension benefits)	Entry-Age Normal	Market Value of Assets

Under the Entry Age Normal Cost Method, each participant's projected benefit is allocated on a level percent of pay basis from entry age to assumed exit age. The Actuarial Accrued Liability is the portion of the present value associated with pay prior to the actuarial valuation date. The Normal Cost is the portion of the present value associated with pay during the current plan year.

The actuarial (market-related) value of assets is determined from market value with investment gains and losses smoothed over a five-year period. The actuarial assumptions used to determine the liabilities are the same in all three measures, with the exception of the investment return assumption.

Summary of Valuation Results

Comments on Results

P.A. 99-0506, effective as of May 30, 2016, changed the City's contribution policy to $199 million in payment year 2016, $208 million in payment year 2017, $227 million in payment year 2018, $235 million in payment year 2019 and $245 million in payment year 2020. For payment years after 2020, the City is required to make level percent of pay contributions for plan years through 2055 that, along with member contributions and investment earnings, are expected to generate a projected funded ratio of 90% by plan year end 2055.

The statutory contribution for tax levy year 2020 (i.e., payment year 2021) is equal to $371.3 million (79.02% of projected pay).

Under the current statutory funding policy the funded ratio is projected to increase slowly over the next 15 years from 18.4% in 2018 to 31.2% in 2032. The funded ratio is projected to increase to 43.6% in 2040, 69.6% in 2050 and 90.0% in 2055. The statutory funding policy generates "back-loaded" City contributions with slow growth in the funded ratio. Underfunding the Fund creates the risk that the long-term investment return cannot be supported, minimal investment income is available to pay benefits, or worse – that benefit obligations cannot be met from the trust.

The calculations in this report were prepared based on the funding policy methods required by Public Act 99-0506. In light of the current funded status of this Retirement Fund, we do not endorse this funding policy because the Statutory funding policy defers funding for benefits into the future and places a higher burden on future generations of taxpayers.

We recommend a funding policy that contributes the net normal cost plus amortization of the unfunded actuarial liability over a reasonable period. For example, contributing the net normal cost plus amortization of the unfunded actuarial liability on a level dollar basis over a 30-year period in our opinion would produce a reasonable growth pattern in the funded ratio. Using this basis, the City's Actuarially Determined Contribution ("ADC") for plan year end 2019, net of member contributions, is approximately $442 million or 96.7% of payroll which compares to the current statutory contribution of $245 million or 53.1% of payroll. The ADC is a required disclosure item under GASB Statement Nos. 67 and 68. We recognize that the State Statute governs the funding policy of the Fund. The purpose of these recommendations is to highlight the difference between the Statutory appropriation methodology and an actuarially sound funding policy and to highlight the risks and additional costs of continuing to underfund the Fund.

The economic actuarial assumptions have been updated since the last actuarial valuation as of December 31, 2017, based on the December 31, 2018, Economic Assumption Review using updated information through 2018. The demographic assumptions remain unchanged from the last actuarial valuation as of December 31, 2017. The demographic assumptions were based on an experience study for the period January 1, 2012, through December 31, 2016.

Effective with Fiscal Year Ending December 31, 2014, GASB Statement No. 67 replaced GASB Statement No. 25 for pension plan financial reporting requirements. GASB Statement No. 68 replaced GASB Statement No. 27 for employer financial reporting effective with fiscal year ending December 31, 2015. The discount rate used for GASB Statement Nos. 67 and 68 reporting purposes will be based on a single equivalent discount rate using a combination of 6.75% for the projected benefits for all current members that can be paid from current assets and projected investment return, future employee contributions from current members, and future employer contributions attributable to current members, and a municipal bond rate for the portion of the projected benefits after assets are depleted. The municipal bond rate is based on a yield or index rate for 20-year, tax exempt general obligation municipal bonds with an average rating of AA/Aa or higher (or equivalent quality on another rating scale). We believe the liability based on the GASB single equivalent discount rate will become an important liability for users of the Fund's financial information.

Due to the single equivalent discount rate and shorter amortization periods required under GASB Statement Nos. 67 and 68, the unfunded liabilities and pension expense will be much higher and more volatile than under the prior GASB standards. The measurements required under GASB Statement Nos. 67 and 68 are provided in a separate report.

Based on the Actuarial Value of Assets, the Unfunded Actuarial Liability increased from $4.46 billion to $5.03 billion during the year. The funded ratio decreased from 20.12% to 18.36%.

Based on the Market Value of Assets, the Unfunded Actuarial Liability increased from $4.46 billion to $5.12 billion, and the funded ratio decreased from 20.17% to 16.83%.

There were six major gain/loss items which had an impact on the unfunded actuarial accrued liability:

- The employer cost in excess of actual contributions generated a loss of approximately $126 million;
- The investment gain/loss on the actuarial value of assets generated an overall loss of $43.7 million;
- Pay increases lower than expected resulted in a gain of $42.5 million;
- Actual experience which differed from expected experience based on the demographic assumptions resulted in a gain of $3.5 million;
- Changes in economic assumptions resulted in an increase (i.e., a loss) in the unfunded actuarial accrued liability of $451.9 million; and
- All other factors generated a gain of $9.1 million.

A more thorough examination of these and other factors can be found in the Reconciliation of Unfunded Liability gain/loss calculation in Table 3.

A summary of the primary results of this valuation is shown in the following table.

Summary of Valuation Results

	December 31, 2017		December 31, 2018	
	$ in Millions	% of Pay[1]	$ in Millions	% of Pay[1]
Contribution Levels				
Statutory Contribution [2]	$ 235.0	49.48 %	$ 245.0	53.11 %
(Tax Levy Year)	(2018)		(2019)	
(Payment Year)	(2019)		(2020)	
Statutory Contribution			371.3	79.02
(Tax Levy Year)			(2020)	
(Payment Year)			(2021)	
Actuarially Determined Contribution (ADC) [3]	412.2	87.82	442.0	96.73
(Plan Year)	(2018)		(2019)	
Funding Status -- Actuarial Value				
Actuarial Value of Assets	$ 1,123.4	239.32	$ 1,130.4	247.36
Actuarial Liability	5,582.4	1,189.25	6,155.9	1,347.12
Funding Ratios	20.12%	N/A	18.36%	N/A
Funding Status -- Market Value				
Market Value of Assets	$ 1,126.2	239.91	$ 1,035.8	226.67
Actuarial Liability	5,582.4	1,189.25	6,155.9	1,347.12
Funding Ratios	20.17%	N/A	16.83%	N/A
Funding Status -- ADC Value				
Actuarial Value of Assets	$ 1,123.4	239.32	$ 1,130.4	247.36
Actuarial Liability - Entry Age	5,582.4	1,189.25	6,155.9	1,347.12
Funding Ratios	20.12%	N/A	18.36%	N/A

[1]Payroll of $469.4 million for 2017 and $457.0 million for 2018 includes duty availability pay for both years.
[2]Pursuant to P.A. 99-0506, the fiscal year 2018 tax levy, payable in fiscal year 2019, is equal to $235 million and the fiscal year 2019 tax levy, payable in fiscal year 2020, is equal to $245 million. The statutory contribution expressed as a percentage of pay is based on projected payroll for the respective tax levy year.
[3]The ADC for fiscal year December 31, 2019, was determined based on a 30-year level dollar amortization policy for pension benefits.

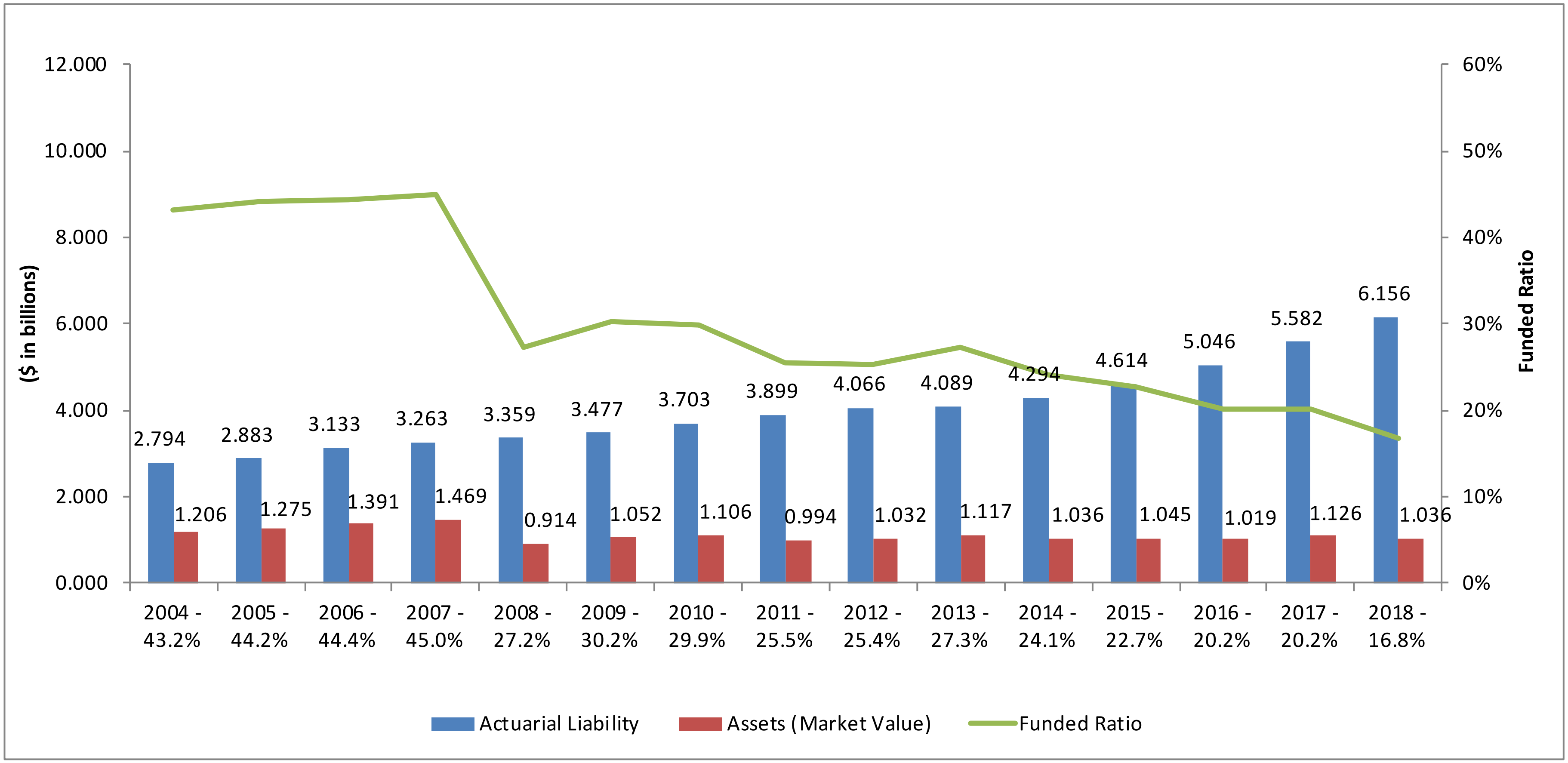
Five-Year Projection of Statutory Contributions

Following is a five-year projection of the statutory contributions based on fixed contributions for payment years 2019 through 2020 and statutory actuarial projections after 2020.

Projected City Contribution as of December 31, 2018 $ in thousands		
Tax Levy Year	**Payment Year**	**Statutory Contribution**
2018	2019	$249,690
2019	2020	245,000
2020	2021	371,258
2021	2022	378,587
2022	2023	387,261
2020 & Thereafter as % of Projected Pay	2021 & Thereafter as % of Projected Pay	79.02%

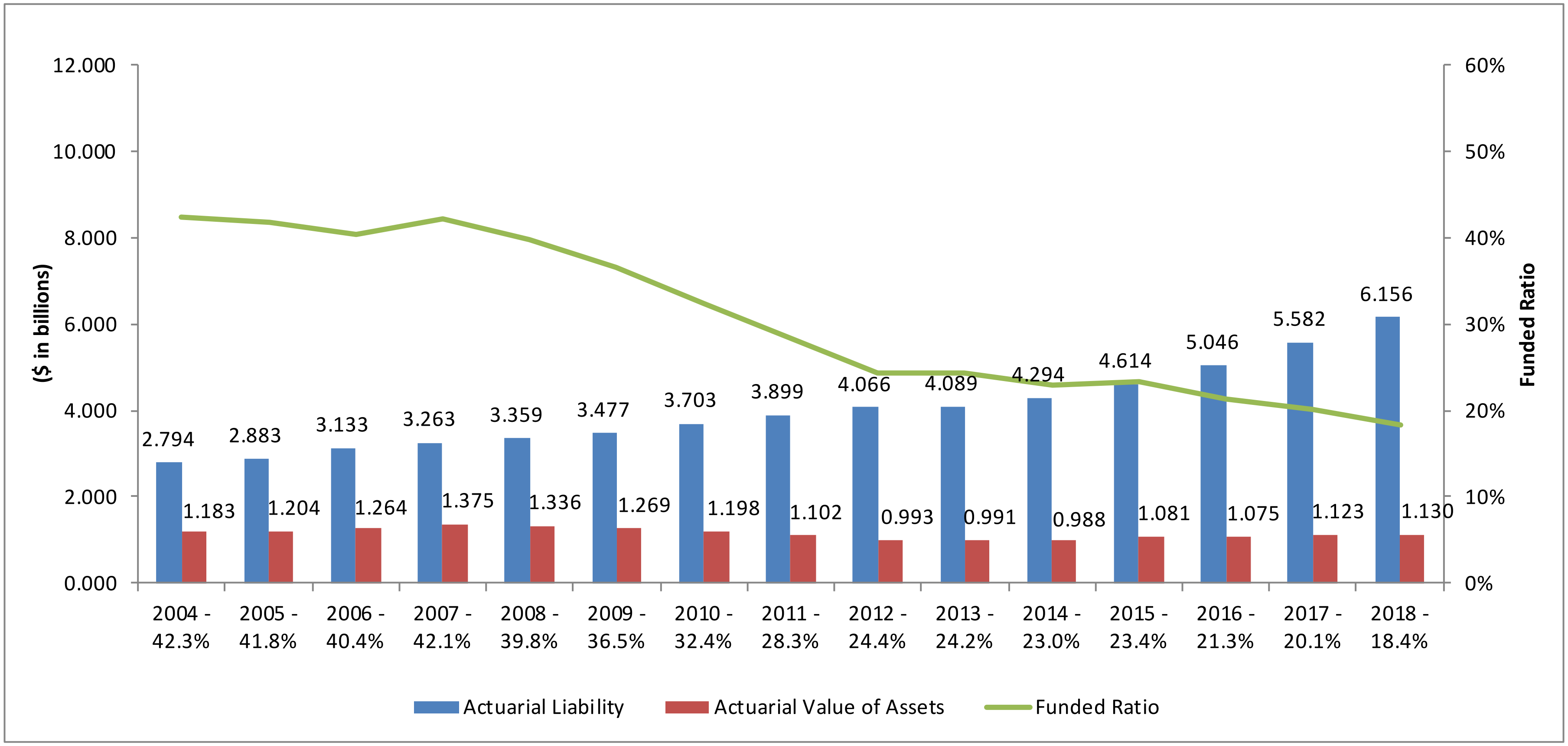
The statutory contribution for payment year 2021 is $371.3 million, which is approximately 79.02% of projected payroll in 2021. For payment years after 2021, the projected city contribution is equal to 79.02% of projected payroll, which will increase as a dollar amount as payroll increases. Full projection results through 2055 are shown in Table 2A. The Statutory contributions set forth in this report represent the contribution amounts determined on a basis consistent with the state Statute.

Components of Funding Ratio
Based on Market Value



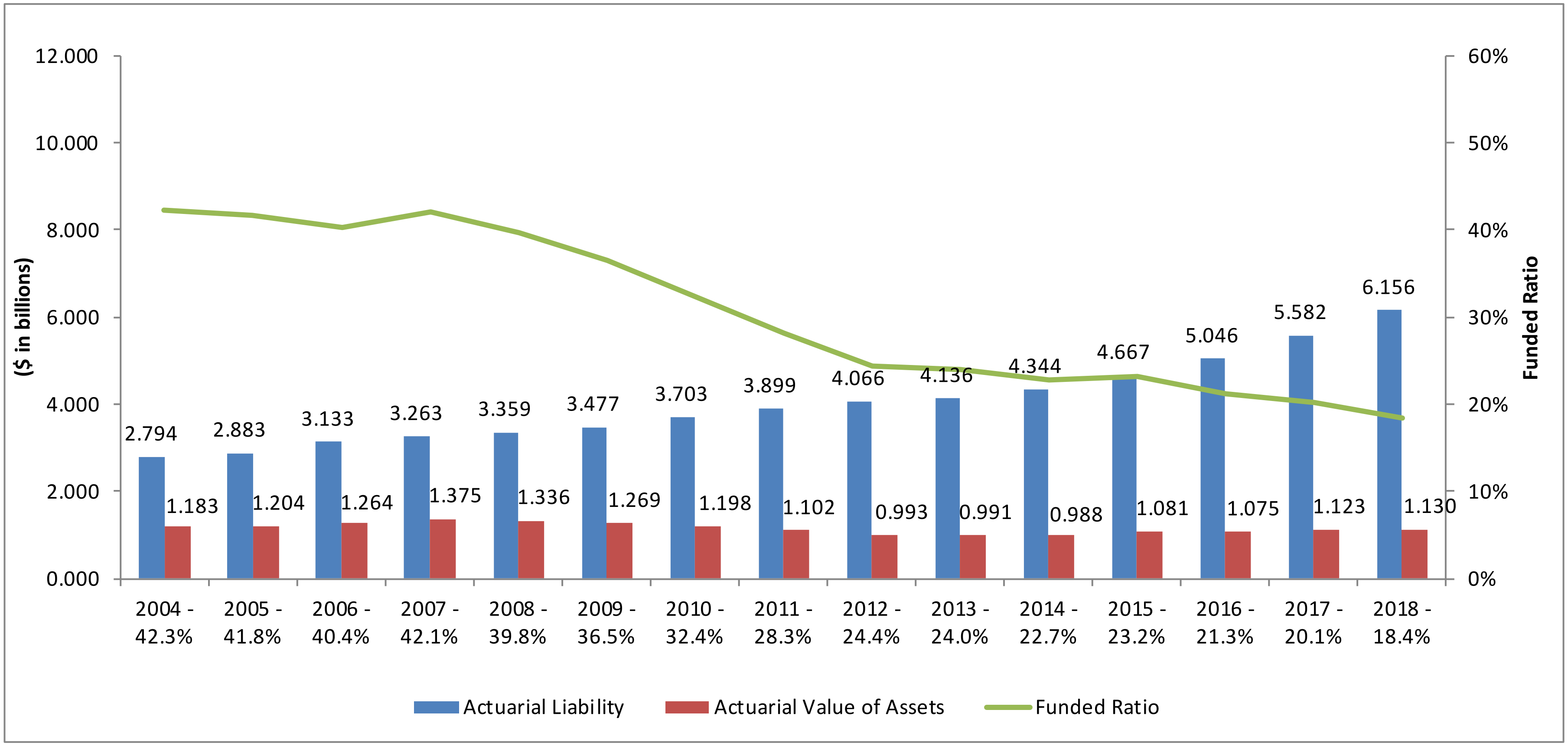
Years 2013 through 2015 used Projected Unit Credit for Actuarial Liabilities and Actuarial Liabilities for 2016 through 2018 and all years prior to 2013 used the Entry-Age Normal cost method. Market Value of Assets used for all years.

Components of Funding Ratio
Based on Actuarial Value



State reporting for 2016 through 2018 uses the Entry-Age Normal cost method. Years 2013 through 2015 used Projected Unit Credit for Actuarial Liabilities. Actuarial Liabilities prior to 2013 also use the Entry-Age Normal cost method. State reporting of assets is based on Actuarial (Market-Related) Value for Assets beginning in 2013 and Book Value of assets prior to 2013.

Components of Funding Ratio
Used for Development of ADC under GASB Statement Nos. 67 and 68



GASB ADC Actuarial Value of Assets based on five-year smoothing for all years. Actuarial Liabilities uses Entry-Age Normal cost method for all years.

Summary of Valuation Results

Participants

The major characteristics of the member data of the Fund are summarized as follows:

	December 31, 2017	December 31, 2018
Active Participants[1]		
Number	4,613	4,487
Average Age	45.9	45.7
Average Service	15.7	15.3
Average Annual Salary[2]	$98,157	$98,243
Retirees		
Number	3,257	3,422
Average Age	69.5	69.2
Average Monthly Benefit	$ 6,492	$ 6,705
Survivors[3]		
Number	1,266	1,263
Average Age	78.1	78.4
Average Monthly Benefit	$ 2,301	$ 2,362

[1] *Includes eight participants on ordinary disability who continue to accrue benefit service in 2017, and six participants on ordinary disability who continue to accrue benefit service in 2018.*
[2] *Average Annual Salary excludes duty availability pay.*
[3] *Includes one parent annuitant.*

Total participants receiving benefits under the Fund, including disability, widow and children, increased 2.9% during 2018 from 4,886 to 5,028. Total expenditures for these benefits increased from $302.5 million in 2017 to $320.6 million during 2018, or 6.0%.

Changes in Provisions of the Fund

The following Public Acts were passed in 2018 by the 100th General Assembly that made changes to the Fund Provisions, but did not impact the results of the actuarial valuation.

Public Act 100-1144 effective November 28, 2018

Authorizes a person to participate in the Chicago Firefighter Article if he or she (1) is or was employed and receiving a salary as a fireman, (2) has at least 5 years of service under the Chicago Firefighter Article, (3) is employed in a position covered under a specified provision of the Chicago Municipal Article relating to aldermen and members of the city council, (4) made an election under the Chicago Municipal Article to not receive service credit or be a participant under that Article, and (5) made an election to participate under the Chicago Firefighter Article. Defines salary for such a person as the lesser of (i) the salary associated with the highest career service rank under the Chicago Firefighter Article or (ii) the actual salary received by that person for service under a specified provision of the Chicago Municipal Article relating to aldermen and members of the city council.

Public Act 100-1148 effective December 10, 2018

Technical correction related to filing copies of the report as required by Section 3.1 of the General Assembly Organizational Act and with the State Government Report Distribution Center for the General Assembly.

Actuarial Assumptions

Actuarial assumptions are used to project future demographic and economic expectations for purposes of valuing the liabilities of the plan. The assumptions should reflect current patterns. However, their primary orientation is the long-term outlook for each factor affecting the valuation. Thus, while actual experience will fluctuate over the short run, actuarial assumptions are chosen in an attempt to model the future long-term experience.

There are two general types of actuarial assumptions:

1. Demographic Assumptions – reflect the flow of participants into and out of a retirement system; and

2. Economic Assumptions – reflect the effect of the economic climate on a retirement system.

Demographic assumptions can be readily studied over recent plan experience. Economic assumptions can be studied against recent experience; however, future experience is more likely to be a result of outside factors than of plan specific experience. The most significant demographic assumptions are: active turnover, retirement and post-retirement mortality. The most significant economic assumptions are: pay increases, investment return and inflation. Other actuarial assumptions include: disability incidence, active mortality and percent married.

Changes in Actuarial Assumptions & Methods

The actuarial assumptions have been changed since the last report to reflect the results of the Economic Assumption Review performed for the December 31, 2018, actuarial valuation. The demographic actuarial assumptions remain unchanged from the assumptions previously used for the Decembers 31, 2017, actuarial valuation.

The change in economic actuarial assumptions increased the actuarial liability as of December 31, 2018, by $451.9 million. Due to the current funding policy which includes fixed contributions through payment year 2020, the increase in actuarial accrued liability due to the change in assumptions is financed after payment year 2020 as part of the City's statutory contribution.

Summary of Valuation Results

Following is a summary of the actuarial assumptions adopted by the Board as a result of the most recent economic experience study:

Economic Assumptions

- **Price inflation**: Decrease the rate of price inflation from 2.50% to 2.25%.

- **Retiree Cost-of-Living Adjustment and Increases in the Pay Cap for Pensionable Pay for Participants Hired on and After January 1, 2011**: Decrease the assumed rate of COLA and increases in capped pay for participants hired on or after January 1, 2011, from 1.25% to 1.125 % (½ of 2.25%).

- **Investment return**: Decrease the nominal investment return assumption from 7.50% to 6.75%.

- **General wage inflation and payroll growth assumption**: Maintain the productivity assumption of 1.25% and decrease the general wage inflation assumption from 3.75% to 3.50%. This assumption serves as the across-the-board portion of salary increases and the rate at which the pay at hire is assumed to increase in future years for projection purposes.

- **Salary increase**: Lower assumed salary increase rates on an aggregate basis. Rates were increased for members during the first three years of service and decreased for service greater than three years, with underlying wage inflation of 3.50%.

Asset Valuation Method

The method used to develop the Fund's Actuarial Value of Assets is as follows: In years when Fund assets earn above the assumed investment rate of return (i.e., experience gain) or below the assumed investment rate of return (i.e., experience loss) the gain (or loss) will be gradually recognized over five years. This approach both smoothes the Fund's level of actuarially determined contributions and ensures the Fund's assets will track the market value of assets.

2018 Fund Experience

Investment Return

During 2018, assets earned (5.2)% on a market basis and 3.6% on an actuarial basis which compares to the assumed rate of return of 7.5% from the prior actuarial valuation. Overall, the fund experienced an actuarial loss due to investment performance, on a market basis, and an actuarial loss on an actuarial (smoothed) value basis, during the year.

The Fund had an investment loss in 2018 of $141.3 million relative to the 7.5% expected rate of return on a market value basis. The loss on the Actuarial (Market-Related) Value of Assets relative to the 7.5% expected rate of return was $43.7 million.

Summary of Valuation Results

Pay Increase

Effective December 31, 2018, the salary increase assumption consists of a 3.50% base increase with an additional service-based increase. For the current continuing actives in 2018, the average salary increase was approximately 2.8%. This was 6.1 percentage points below our aggregate assumption of 8.9%, resulting in an actuarial gain of approximately $42.5 million, or 0.69% of total liabilities.

Assumption Changes

The economic actuarial assumptions have been changed since the last report to reflect the results of the economic experience study. The Board adopted the new economic assumptions at their March 18, 2019, meeting.

As of December 31, 2018, the change in economic actuarial assumptions increased the actuarial accrued liability by $451.9 million.

Other

The combination of retirements, disablements and deaths resulted in a net actuarial gain of $3.5 million. Gains and losses from all other sources, including new hires and data corrections, resulted in a net gain of $9.1 million.

Conclusion

Based on our analysis of the recent experience and expectation of the future, we believe that the assumptions are reasonable for the purpose of the measurement of the Fund's costs in effect as of December 31, 2018, under the current funding provisions of P.A. 99-0506. Table 3 of Appendix 1 shows a more detailed development of the actuarial gains and losses for the plan year ending December 31, 2018.

During 2018, the Fund received contributions (net of investment return) of $295.6 million and paid out benefits and expenses of $327.9 million resulting in net negative cash flow of $32.4 million. In addition, as of December 31, 2018, the funded ratio of the plan was only 16.83% based on the Market Value of Assets, the Entry Age Normal cost method and the current investment return assumption of 6.75%.

If contributions are not made on a timely basis, or if benefits are projected to be greater than the contributions in the near term, the Fund may not have enough liquidity to continue making all the required benefit payments without changing its investment portfolio to one comprised of a larger percentage of short term (cash generating) investments.

If the Fund changes its investment portfolio to one comprised of a larger percentage of short term investments, the Fund may no longer be able to support the current 6.75% investment return assumption.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

The determination of the accrued liability and the statutory contribution requires the use of actuarial assumptions regarding future economic and demographic experience. Risk measures, as illustrated in this report, are intended to aid in the understanding of the effects of future experience differing from the actuarial assumptions used in the course of the actuarial valuation. Risk measures may also help with illustrating the potential volatility in the accrued liability and the total required employer contribution that result from the differences between actual experience and the actuarial assumptions.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions due to changing conditions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period, or additional cost or contribution requirements based on the Fund's funded status); and changes in plan provisions or applicable law. The scope of this actuarial valuation does not include an analysis of the potential range of such future measurements.

Examples of risk that may reasonably be anticipated to significantly affect the Fund's future financial condition include:

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the Fund's funding policy or material changes may occur in the anticipated number of covered employees, covered payroll, or other relevant contribution base;
4. Salary and Payroll risk – actual salaries and total payroll may differ from expected, resulting in actual future accrued liability and contributions differing from expected;
5. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed; and
6. Other demographic risks – members may terminate, retire or become disabled at times other than assumed resulting in actual future accrued liability and contributions differing from expected.

The effects of certain trends in experience can generally be anticipated. For example if the investment return since the most recent actuarial valuation is less (or more) than the assumed rate, the cost of the plan can be expected to increase (or decrease). Likewise if longevity is improving (or worsening), increases (or decreases) in cost can be anticipated.

The statutory contribution for tax levy year 2020 shown on page 19 should be considered as the minimum contribution that complies with the funding policy governed by statute. The timely receipt of the statutory contribution is critical to support the financial health of the Fund. Users of this report should be aware that contributions made at the statutorily determined amount do not necessarily guarantee benefit security.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

Plan Maturity Measures

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

	2017	2018
Ratio of the Market Value of Assets to Covered Payroll	2.40	2.27
Ratio of Actuarial Accrued Liability to Covered Payroll	11.89	13.47
Ratio of Actives to Retirees and Beneficiaries	1.00	0.94
Ratio of Net Cash Flow to Market Value of Assets	-2.97%	-3.12%

Ratio of Market Value of Assets to Payroll

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 5.0 times the payroll, a return on assets 5 percent different than assumed would equal 25 percent of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

Ratio of Actuarial Accrued Liability to Payroll

The relationship between actuarial accrued liability and payroll is a useful indicator of the potential volatility of contributions for a fully funded plan. A funding policy that targets a funded ratio of 100 percent is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 13 times the payroll, a change in liability 2 percent other than assumed would equal 26 percent of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

Ratio of Actives to Retirees and Beneficiaries

A young plan with many active members and few retirees will have a high ratio of active to retirees. A mature open plan may have close to the same number of actives to retirees resulting in a ratio near 1.0. A super-mature or closed plan may have significantly more retirees than actives resulting in a ratio below 1.0.

Ratio of Net Cash Flow to Market Value of Assets

A positive net cash flow means contributions exceed benefits and expenses. A negative cash flow means existing funds are being used to make payments. A certain amount of negative net cash flow is generally expected to occur when benefits are prefunded through a qualified trust. Large negative net cash flows as a percent of assets may indicate a super-mature plan or a need for additional contributions.

Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability.

APPENDIX 1

RESULTS OF ACTUARIAL VALUATION

Table 1A
Summary

	December 31, 2017	December 31, 2018
Assets		
Market Value - Beginning of Year	$ 1,019,013,793	$ 1,126,153,314
Income		
Investment Income Net of Expenses	$ 140,569,856	$ (58,000,233)
Employer Contributions	228,452,611	249,684,038
Employee Contributions	47,364,276	45,894,781
Miscellaneous	22,879	5,853
Subtotal	$ 416,409,622	$ 237,584,439
Outgo (Refunds, Benefits, & Administration)	$ 309,270,101	$ 327,947,414
Market Value - End of Year	$ 1,126,153,314	$ 1,035,790,339
Actuarial Value - End of Year	1,123,388,840	1,130,369,929
Book Value - End of Year	984,326,672	1,027,449,272
Members		
Active	4,613	4,487
Retirees	3,257	3,422
Survivors [1]	1,266	1,263
Disabilities	276	259
Children	79	78
Payroll Data		
Valuation Payroll [2]	$ 469,407,281	$ 456,969,301
Average Salary	101,757	101,843

[1] *Includes Widow, Compensation and Parent Annuitants.*
[2] *The valuation payroll includes compensation for six ordinary disability participants. They continue to accrue benefit service and hence additional liability while on ordinary disability. Both years include duty availability pay.*

Table 1B
Summary

	December 31, 2017	December 31, 2018
Actuarial Values		
Statutory Funding		
Actuarial Liability	$5,582,426,435	$6,155,919,204
Assets - Actuarial Value	1,123,388,840	1,130,369,929
Unfunded Liability	4,459,037,595	5,025,549,275
Funded Ratio	20.12%	18.36%
Statutory Employer Contribution[1]	235,000,000	245,000,000
(Tax Levy Year)	(2018)	(2019)
Market Values		
Actuarial Liability	$5,582,426,435	$6,155,919,204
Assets - Market Value	1,126,153,314	1,035,790,339
Unfunded Liability	4,456,273,121	5,120,128,865
Funded Ratio	20.17%	16.83%
ADC Values		
Actuarial Liability	$5,582,426,435	$6,155,919,204
Assets - Actuarial Value	1,123,388,840	1,130,369,929
Unfunded Liability[1]	4,459,037,595	5,025,549,275
Funded Ratio	20.12%	18.36%
Actuarially Determined Contribution (ADC) [2]	412,220,284	442,044,761
(Plan Year End)	(2018)	(2019)

[1]Pursuant to P.A. 99-0506, effective May 30, 2016, the fiscal year 2018 tax levy, payable in fiscal year 2019, is equal to $235,000,000 and the fiscal year 2019 tax levy, payable in fiscal year 2020, is equal to $245,000,000.
[2]The Actuarially Determined Contribution (ADC) as defined by GASB Statements Nos. 67 and 68 is recognized for fiscal years on and after December 31, 2015. The ADC for fiscal year December 31, 2019, was determined based on a 30-year level dollar amortization policy for pension benefits.

Table 2A
Development of Statutory Contribution

Actuarial Valuation Projection Results as of December 31, 2018
Discount Rate of 6.75%
($ in Thousands)

Year Ending	Actuarial Accrued Liability	Market Value of Assets	Actuarial Value of Assets	Unfunded Liability	Actuarial Value Funded Ratio	Capped Payroll	Employer Normal Cost	Statutory Contribution [1]	Statutory Contribution as % of Pay	Employee Contributions	Benefit Payments	Admin Expenses
2018	$6,155,919	$1,035,790	$1,130,370	$5,025,549	18.36%	$456,969	$42,121	$249,690	54.64%	$45,895	$ 324,662	$3,285
2019	6,316,916	1,027,192	1,088,664	5,228,252	17.23%	461,286	59,291	245,000	53.11%	42,557	348,197	3,359
2020	6,471,743	1,128,874	1,172,307	5,299,437	18.11%	469,828	57,649	371,258	79.02%	44,426	364,913	3,435
2021	6,620,171	1,225,979	1,254,233	5,365,938	18.95%	479,103	57,315	378,587	79.02%	45,288	381,751	3,512
2022	6,763,226	1,322,820	1,322,820	5,440,405	19.56%	490,080	57,211	387,261	79.02%	46,311	397,566	3,591
2023	6,901,873	1,422,162	1,422,162	5,479,711	20.61%	503,334	57,417	397,734	79.02%	47,555	412,629	3,672
2024	7,035,933	1,524,778	1,524,778	5,511,155	21.67%	517,367	57,714	408,823	79.02%	48,876	427,745	3,754
2025	7,164,464	1,630,047	1,630,047	5,534,417	22.75%	531,072	57,953	419,653	79.02%	50,164	443,381	3,839
2026	7,286,322	1,736,492	1,736,492	5,549,831	23.83%	543,446	58,033	429,431	79.02%	51,324	459,476	3,925
2027	7,401,620	1,845,184	1,845,184	5,556,436	24.93%	556,513	58,243	439,756	79.02%	52,541	475,214	4,013
2028	7,511,898	1,959,499	1,959,499	5,552,399	26.09%	571,587	58,776	451,668	79.02%	53,947	489,544	4,104
2029	7,617,743	2,080,437	2,080,437	5,537,306	27.31%	586,394	59,372	463,368	79.02%	55,332	503,020	4,196
2030	7,718,852	2,206,745	2,206,745	5,512,107	28.59%	598,759	59,743	473,139	79.02%	56,490	516,049	4,291
2031	7,814,332	2,335,448	2,335,448	5,478,884	29.89%	607,077	59,725	479,712	79.02%	57,257	528,851	4,387
2032	7,904,188	2,466,899	2,466,899	5,437,290	31.21%	615,069	59,697	486,027	79.02%	57,990	541,237	4,486
2033	7,988,635	2,601,527	2,601,527	5,387,108	32.57%	622,610	59,663	491,985	79.02%	58,677	552,996	4,587
2034	8,068,122	2,739,825	2,739,825	5,328,297	33.96%	629,418	59,595	497,366	79.02%	59,294	563,861	4,690
2035	8,143,437	2,882,573	2,882,573	5,260,864	35.40%	635,430	59,493	502,116	79.02%	59,823	573,520	4,795
2036	8,215,102	3,030,453	3,030,453	5,184,649	36.89%	640,878	59,380	506,422	79.02%	60,293	582,329	4,903
2037	8,283,768	3,184,615	3,184,615	5,099,152	38.44%	646,226	59,282	510,647	79.02%	60,741	590,265	5,014
2038	8,350,115	3,346,524	3,346,524	5,003,591	40.08%	651,861	59,253	515,100	79.02%	61,210	597,436	5,126
2039	8,414,924	3,517,687	3,517,687	4,897,237	41.80%	657,616	59,262	519,648	79.02%	61,679	603,737	5,242
2040	8,478,771	3,699,171	3,699,171	4,779,600	43.63%	663,118	59,303	523,995	79.02%	62,119	609,383	5,360
2041	8,541,912	3,891,783	3,891,783	4,650,128	45.56%	668,415	59,391	528,181	79.02%	62,536	614,743	5,480
2042	8,604,704	4,096,831	4,096,831	4,507,873	47.61%	674,021	59,572	532,611	79.02%	62,977	619,827	5,604
2043	8,667,493	4,315,561	4,315,561	4,351,932	49.79%	679,806	59,843	537,182	79.02%	63,427	624,653	5,730
2044	8,730,575	4,549,367	4,549,367	4,181,208	52.11%	685,947	60,215	542,034	79.02%	63,900	629,316	5,859
2045	8,794,341	4,799,732	4,799,732	3,994,609	54.58%	692,381	60,711	547,119	79.02%	64,395	633,766	5,990
2046	8,859,207	5,068,374	5,068,374	3,790,833	57.21%	699,298	61,348	552,585	79.02%	64,924	638,034	6,125
2047	8,925,713	5,357,164	5,357,164	3,568,548	60.02%	706,663	62,149	558,404	79.02%	65,495	642,057	6,263
2048	8,994,601	5,667,766	5,667,766	3,326,835	63.01%	713,854	63,129	564,086	79.02%	66,117	645,698	6,404
2049	9,066,812	6,002,658	6,002,658	3,064,154	66.20%	721,566	64,285	570,180	79.02%	66,803	648,824	6,548
2050	9,143,163	6,364,193	6,364,193	2,778,970	69.61%	729,611	65,570	576,538	79.02%	67,520	651,537	6,695
2051	9,223,925	6,754,164	6,754,164	2,469,761	73.22%	737,811	66,963	583,017	79.02%	68,239	654,367	6,846
2052	9,309,365	7,174,377	7,174,377	2,134,988	77.07%	746,111	68,506	589,576	79.02%	68,985	657,406	7,000
2053	9,399,794	7,626,803	7,626,803	1,772,991	81.14%	754,505	70,182	596,209	79.02%	69,746	660,595	7,158
2054	9,495,669	8,113,657	8,113,657	1,382,011	85.45%	762,993	71,999	602,916	79.02%	70,529	663,833	7,319
2055	9,597,640	8,637,490	8,637,490	960,150	90.00%	771,577	73,941	609,699	79.02%	71,339	666,947	7,483

[1] *Contribution receivable to be paid in the following year. The funded ratio includes receivable contribution.*

Table 2B
Development of Statutory Contribution for Tax Levy Year 2020

(1) Projected Normal Cost for 2020	$	102,074,367
(2) Projected Actuarial Accrued Liability (AAL) at 12/31/2019[1]	$	6,316,915,955
(3) Projected Unfunded AAL (UAAL)		
(a) Projected Actuarial Value of Assets at 12/31/2019	$	1,088,664,364
(b) UAAL [2-3(a)]	$	5,228,251,591
(4) Estimated Member Contributions during 2020	$	44,425,813
(5) Statutory Contribution as % of Pay for Tax Levy Year 2020		79.02%
(6) Projected Capped Payroll	$	469,827,859
(7) Estimated City Contribution for Tax Levy Year 2020 (Payment Year 2021)	$	371,257,505 [2]

[1] Pension liabilities were discounted at 6.75% per year, and are based on the Entry Age Normal method.
[2] Based on funding policy prescribed in P.A. 99-0506.

Table 2C
Development of Actuarially Determined Contribution under GASB Statement Nos. 68 and 68 for 2019

(1) Normal Cost for 2019	$	98,575,290
(2) Actuarial Accrued Liability (AAL) at 12/31/2018	$	6,155,919,204
(3) Unfunded AAL (UAAL)		
(a) Actuarial Value of Assets at 12/31/2018	$	1,130,369,929
(b) UAAL [2-3(a)]	$	5,025,549,275
(4) Amortization (Level $) Payable at Beginning of Year[1]	$	369,899,987
(5) Minimum Actuarially Calculated Contributions		
(a) Interest Adjustment for Semimonthly Payment	$	16,125,990
(b) Total Contribution [1+4+5(a)]; but not less than zero	$	484,601,267
(c) Total Contribution (Percent of Pay)		106.05%
(6) Estimated Member Contributions	$	42,556,506
(7) Actuarially Determined Contribution (ADC)		
(a) Actuarially Determined Contribution [5(b)-6]	$	442,044,761
(b) Actuarially Determined Contribution (Percent of Pay)		96.73%
(8) Estimated City Contribution for 2019	$	245,000,000
(9) City Contribution Deficiency/(Excess) for 2019		
(a) in Dollars [(7(a)-8]	$	197,044,761
(b) as a Percentage of Pay		43.12%
(10) Combined City/Member Contributions Deficiency/(Excess) for 2019		
(a) in Dollars [5(b)-6-8]	$	197,044,761
(b) as a Percentage of Pay		43.12%

[1] *Pension UAAL is amortized over a level dollar 30-year period.*

Table 3
Reconciliation of Unfunded Liability

	2017	2018
(1) Unfunded Actuarial Accrued Liability - Beginning of Year	$3,971,032,567	$4,459,037,595
(2) Gains/(Losses) During the Year Attributable to:		
Employer Cost in Excess of Contributions	(111,160,831)	(125,982,116)
Gain/(Loss) on Investment Return (AVA)	2,578,084	(43,718,669)
Gain/(Loss) from Salary Experience	40,198,419	42,453,109
Gain/(Loss) from Demographic Experience	(35,841,248)	3,546,546
Gain/(Loss) from Assumption Changes [a,b]	(355,127,782)	(451,936,427)
Gain/(Loss) from All Other Sources	(28,651,670)	9,125,877
Total Actuarial Gain/(Loss)	$ (488,005,028)	$ (566,511,680)
Gain/(Loss) from Provision Changes	$ -	$ -
Total Actuarial Gain (Loss)	$ (488,005,028)	$ (566,511,680)
(3) Unfunded Actuarial Accrued Liability - End of Year (1)-(2)	$4,459,037,595	$5,025,549,275

[a] *Demographic assumption changes as of December 31, 2017, include changes to mortality, retirement, termination and disability assumptions.*
[b] *Economic assumption changes as of December 31, 2018, include decreasing the assumed investment rate to 6.75%, decreasing the assumed wage inflation rate to 3.50% and decreasing the assumed general inflation rate to 2.25%.*

Table 4
Summary of Basic Actuarial Values
As of December 31, 2018

	APV of Projected Benefits	Actuarial Accrued Liability (AAL)		
		Total	Tier 1	Tier 2
(1) Values for Active Members	$3,033,266,156	$2,162,853,641	$2,106,939,555	$55,914,086
(2) Values for Inactive Members				
(a) Retired	3,374,070,879	3,374,070,879	3,374,070,879	0
(b) Spouse Annuitants	232,871,447	232,871,447	232,871,447	0
(c) Compensation Widows	61,244,091	61,244,091	61,244,091	0
(d) Ordinary Disability	1,366,046	1,366,046	1,318,944	47,102
(e) Occupational Disease Disability	105,073,368	105,073,368	105,073,368	0
(f) Duty Disability	199,914,035	199,914,035	199,914,035	0
(g) Inactive (Deferred Vested)	10,467,674	10,467,674	10,369,983	97,691
(h) Children	7,968,585	7,968,585	7,873,859	94,726
(i) Parent Annuitants	89,438	89,438	89,438	0
Total for Inactives	$3,993,065,563	$3,993,065,563	$3,992,826,044	$239,519
(3) Grand Totals	$7,026,331,719	$6,155,919,204	$6,099,765,599	$56,153,605
(4) Normal Cost for Active Members for 2019	$ 98,575,290			
(5) Actuarial Present Value of Future Compensation	$4,168,353,009			

Table 5
Active Accrued Liability as of December 31, 2018,
And Normal Cost for 2019 by Tier

	Tier 1 Members	Tier 2 Members	Total
(1) Active Members	3,425	1,062	4,487
(2) Payroll	$ 370,605,487	$ 86,363,814	$ 456,969,301
(3) Average Payroll	$ 108,206	$ 81,322	$ 101,843
(4) Active Actuarial Accrued Liability (AAL)	$ 2,106,939,555	$ 55,914,086	$ 2,162,853,641
(5) Normal Cost for 2019	$ 81,690,512	$ 16,884,778	$ 98,575,290
(6) Normal Cost as a Percent of Pay for 2019	22.0%	19.6%	21.6%
(7) Estimated Member Contributions for 2019	$ 34,507,222	$ 8,049,284	$ 42,556,506
(8) Net Normal Cost for 2019	$ 47,183,290	$ 8,835,494	$ 56,018,784
(9) Net Normal Cost as a Percent of Pay for 2019	12.7%	10.2%	12.3%

Table 6
History of Recommended Employer Multiples

Year of Report	Statutory Multiple	P.A. 99-0506 Multiple	Normal Cost Plus Interest	Normal Cost Plus Amortization[6] Level $	Normal Cost Plus Amortization[6] Level % of Salary
1989 [1,2]	2.26	N/A	4.39	4.52	3.41
1990 [1,2]	2.26	N/A	4.41	4.55	3.43
1991	2.26	N/A	4.55	4.69	3.53
1992 [2]	2.26	N/A	4.75	4.89	3.69
1993 [2]	2.26	N/A	4.89	5.03	3.81
1994 [1,2]	2.26	N/A	4.92	5.09	3.71
1995 [2]	2.26	N/A	5.16	5.33	3.78
1996	2.26	N/A	5.02	5.19	3.78
1997 [1,2,3]	2.26	N/A	3.95	4.08	3.00
1998 [2,4]	2.26	N/A	4.31	4.22	2.91
1999	2.26	N/A	3.56	3.49	2.41
2000 [1]	2.26	N/A	4.39	4.30	2.99
2001 [4]	2.26	N/A	4.61	4.44	3.12
2002	2.26	N/A	4.07	4.19	2.93
2003 [1,2]	2.26	N/A	4.90	5.08	3.18
2004 [2,5]	2.26	N/A	4.99	5.19	3.22
2005 [1,7]	2.26	N/A	4.35	4.54	3.09
2006	2.26	N/A	5.14	5.61	4.05
2007 [5]	2.26	N/A	4.93	5.39	3.89
2008	2.26	N/A	5.24	5.72	4.13
2009	2.26	N/A	5.70	6.24	4.47
2010	2.26	N/A	6.35	6.94	4.98
2011 [1]	2.26	N/A	6.81	7.47	5.30
2012	2.26	N/A	5.94	6.52	4.60
2013 [2]	2.26	N/A	5.90	6.45	4.53
2014	2.26	N/A	7.98	8.74	6.10
2015 [1]	N/A	4.66	7.12	7.90	5.72
2016 [2,8]	N/A	5.03	8.12	9.01	6.47
2017 [1,8]	N/A	5.36	8.46	9.41	6.71
2018 [1,8]	N/A	5.74	9.09	10.35	7.52

[1] Change in actuarial assumptions.
[2] Change in benefits.
[3] Change in asset valuation method to GASB.
[4] Change in actuary.
[5] To reflect long-term funding requirements, we have excluded $10,182,825 and $3,229,938 from the 2003 and 2006 employee contributions in the calculation of the respective recommended multiples. This amount is employee contributions for the retroactive pay increases.
[6] Prior to 2005, 40-year amortization used. In 2005, OPEB based on 30-year amortization and pension on 40-year amortization. In 2006, 30-year amortization used for both pension and OPEB.
[7] There was a significant decrease in the multiple from 2004 to 2005. This change is primarily due to the significant increase in employee contributions.
[8] Funding based on P.A. 99-0506.

Table 7
Ordinary Death Benefit Reserve
As of December 31, 2018

ASSETS	
Fund Balance	$ 20,090,677
Present Values of Future Contributions:	
Contributions by Members at $30.00 a Year	1,269,007
Annual City Contribution of $142,000	1,338,675
Unfunded Liability	(7,678,641)
TOTAL ASSETS	$ 15,019,718

LIABILITIES	
Present Value of Future Death Benefits (3%, Plan Mortality Basis)	
Active Members	$ 1,868,616
Retired Members	13,151,102
TOTAL LIABILITIES	$ 15,019,718

Note: Benefits are also included in the accrued liability and valued using the actuarial assumptions.

Table 8
Actuarial Accrued Liability
Prioritized Solvency Test

Valuation Date 12/31	(1) Active Member Contributions	(2) Retirees and Beneficiaries	(3) Active Members (ER Financed Portion)	Actuarial Value of Assets	Portion (%) of Present Value Covered by Assets		
					(1)	(2)	(3)
1999	$357,739,707	$ 1,146,375,517	$375,551,644	$ 1,145,215,019	100.00%	68.69%	0.00%
2000 [a]	354,336,276	1,279,911,268	419,092,931	1,219,486,962	100.00%	67.59%	0.00%
2001 [c]	379,067,821	1,294,672,267	394,977,813	1,245,129,955	100.00%	66.89%	0.00%
2002	394,531,369	1,329,341,162	364,833,686	1,209,768,204	100.00%	61.33%	0.00%
2003 [a,b]	422,940,367	1,458,548,217	635,779,523	1,194,007,767	100.00%	52.87%	0.00%
2004 [b]	443,541,204	1,588,594,240	761,388,911	1,182,578,954	100.00%	46.52%	0.00%
2005 [a]	467,820,652	1,686,377,622	728,737,443	1,203,654,052	100.00%	43.63%	0.00%
2006	501,048,807	1,766,921,009	865,171,711	1,264,497,434	100.00%	43.21%	0.00%
2007	530,027,472	1,859,630,135	873,313,282	1,374,960,353	100.00%	45.44%	0.00%
2008	563,953,942	1,891,673,504	902,950,885	1,335,695,474	100.00%	40.80%	0.00%
2009	581,786,867	2,004,957,552	890,026,376	1,269,231,178	100.00%	34.29%	0.00%
2010	614,377,840	2,069,533,040	1,019,336,955	1,198,113,789	100.00%	28.21%	0.00%
2011 [a]	637,938,254	2,261,555,896	999,405,074	1,101,741,862	100.00%	20.51%	0.00%
2012	644,629,930	2,459,787,835	961,926,046	993,283,741	100.00%	14.17%	0.00%
2013 [a,b]	661,062,321	2,535,327,207	892,816,311	991,213,282	100.00%	13.02%	0.00%
2014	670,825,942	2,675,919,242	946,985,303	988,141,316	100.00%	11.86%	0.00%
2015 [a]	692,657,194	2,875,934,283	1,045,091,771	1,081,041,796	100.00%	13.50%	0.00%
2016 [a,b]	702,218,711	3,107,218,181	1,236,453,410	1,074,857,735	100.00%	11.99%	0.00%
2017 [a]	701,745,771	3,520,967,001	1,359,713,663	1,123,388,840	100.00%	11.98%	0.00%
2018 [a]	684,682,219	3,993,065,563	1,478,171,422	1,130,369,929	100.00%	11.16%	0.00%

[a] *Change in actuarial assumptions or methods.*
[b] *Change in benefits.*
[c] *Change in actuary.*

APPENDIX 2

ASSETS OF THE PLAN

Assets of the Plan

The book value of the plan assets, net of accounts payable, increased from $984 million as of December 31, 2017, to $1,027 million as of December 31, 2018. The market value of the plan assets decreased from $1,126 million as of December 31, 2017, to $1,036 million as of December 31, 2018. The actuarial value of assets increased from $1,123 million as of December 31, 2017, to $1,130 million as of December 31, 2018.

Table 9 details the reconciliation of the market value of assets during 2018 and Table 10 shows the development of the actuarial value of assets as of December 31, 2018.

Table 9
Reconciliation of Market Value of Assets [1]
During 2017 and 2018

	2017	2018
1. Market value of assets beginning of year [1]	$ 1,019,013,793	$ 1,126,153,314
2. Income for plan year:		
a) Member contributions	$ 47,364,276	$ 45,894,781
b) City contributions	228,452,611	249,684,038
c) Investment income net of expenses [2]	140,569,856	(58,000,233)
d) Miscellaneous revenue	22,879	5,853
e) Total income	$ 416,409,622	$ 237,584,439
3. Disbursements for plan year:		
a) Benefit payments		
i) Pension	$ 302,518,486	$ 320,595,085
b) Refunds	3,579,629	4,067,219
c) Administration	3,171,986	3,285,110
d) Total disbursements	$ 309,270,101	$ 327,947,414
4. Market value of assets end of year	$ 1,126,153,314	$ 1,035,790,339
5. Approximate rate of return in Year: [3]		
a) Gross [4]	14.60%	-4.71%
b) Net of investment expense	14.02%	-5.23%

[1] *The assets provided by the Fund are still in draft form pending finalization of alternative investment balances. The Fund and their auditor do not anticipate a material change in the asset value.*

[2] *Investment income net of expenses used for Book value for plan year 2017 is $62,816,859 and book value of assets as of December 31, 2017, is $984,326,672. Investment income net of expenses used for Book value for plan year 2018 is $75,485,342 and book value as of December 31, 2018, is $1,027,449,272.*

[3] *Method used for calculating approximate rate of return does not reflect specific timing of income and outflows. It is also based on total assets, including contribution receivables, not invested assets.*

[4] *Reflects investment expenses of $5,493,881 for plan year end December 31, 2017, and $5,859,855 for plan year end December 31, 2018.*

Table 10
Development of Actuarial (Market-Related) Value of Assets
As of December 31, 2018

Year Ending December 31	2018	2019	2020	2021	2022
Beginning of Year:					
(1) Market Value of Assets	$1,126,153,314				
(2) Actuarial Value of Assets	1,123,388,840				
End of Year:					
(3) Market Value of Assets	1,035,790,339				
(4) Contributions and Disbursements					
(4a) City Contributions & Misc.	249,689,891				
(4b) Member Contributions	45,894,781				
(4c) Benefit Payouts & Refunds	(324,662,304)				
(4d) Administrative Expenses	(3,285,110)				
(4e) Net of Contributions and Disbursements	(32,362,742)				
(5) Total Investment Income					
=(3)-(1)-(4e)	(58,000,233)				
(6) Projected Rate of Return	7.50%				
(7) Projected Investment Income					
=(1)x(6)+([1+(6)]^.5-1)x(4e)	83,269,835				
(8) Investment Income in					
Excess of Projected Income	(141,270,068)				
(9) Excess Investment Income Recognized					
This Year (5-year recognition)					
(9a) From This Year	$ (28,254,014)				
(9b) From One Year Ago	13,074,959	$ (28,254,014)			
(9c) From Two Years Ago	(2,859,824)	13,074,959	$ (28,254,014)		
(9d) From Three Years Ago	(15,068,769)	(2,859,824)	13,074,959	$ (28,254,014)	
(9e) From Four Years Ago	(10,818,356)	(15,068,767)	(2,859,823)	13,074,960	$ (28,254,012)
(9f) Total Recognized Investment Gain	(43,926,004)	(33,107,646)	(18,038,878)	(15,179,054)	(28,254,012)
(10) Change in Actuarial Value of Assets					
=(4e)+(7)+(9f)	6,981,089				
End of Year:					
(3) Market Value of Assets	**$1,035,790,339**				
(11) Actuarial Value of Assets = (2)+(10)	**$1,130,369,929**				

APPENDIX 3

DATA REFLECTING PLAN MEMBERS

Exhibit A
Summary of Changes in Active Participants
For Fiscal Year Ending December 31, 2018

	Male	Female	Total
Number of Participants at Beginning of Fiscal Year	4,258	347	4,605
Increases:			
Participants Added during Year	137	21	158
Participants Returning From Inactive or Disability Status	7	0	7
Totals	4,402	368	4,770
Decreases:			
Terminations during Year	274	15	289
Number of Participants at End of Fiscal Year	4,128	353	4,481
Total Inactive Participants	73	19	92
Decreases:			
Withdrawal (With Refunds)[1]	2	1	3
Withdrawal (Without Refunds)	16	2	18
Ordinary Disability Benefit	1	1	2
Occupational Disease Disability Benefit	14	0	14
Duty Disability Benefit	9	1	10
Retirements	227	9	236
Deaths (Occupational)	1	0	1
Deaths (Non-occupational)	4	1	5
Totals	**274**	**15**	**289**

[1] *This total differs from the total of six shown in Exhibit D due to the fact that only three of the refunds were paid to participants who were considered to be active as of December 31, 2017.*

Exhibit B
Summary of Changes in Annuitants and Beneficiaries
For Fiscal Year Ending December 31, 2018

	Number at Beginning of Year	Additions During Year	Decreases During Year	Number at End of Year
Service Retirement Annuities	3,257	278	113	3,422
Widow Annuities	1,181	71	71	1,181
Children's Annuities	79	6	7	78
Parent Annuities	1	0	0	1
Ordinary Disability Benefit (Non-Occupational)	8	2	4	6
Occupational Disease Disability Benefit	86	15	12	89
Duty Disability Benefit (Occupational)	190	10	30	170
Widows' Compensation Annuities (Service Connected Death)	84	0	3	81
Totals	**4,886**	**382**	**240**	**5,028**

Exhibit C

Part I – Total Lives and Annual Salaries of Active Male Participants Classified by Age and Years of Service as of December 31, 2018

	Years of Service										
AGE	Under 1 year	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 and over	Total	Annual Salary
Under 20										**0**	
											$ 0
20 to 24	26	22								**48**	
	1,463,904	1,643,730									**3,107,634**
25 to 29	46	145								**191**	
	2,589,984	10,949,598									**13,539,582**
30 to 34	42	242	107	40						**431**	
	2,364,768	19,405,302	9,636,036	3,758,142							**35,164,248**
35 to 39	21	202	198	129	1					**551**	
	1,182,384	16,416,990	17,829,102	12,229,572	103,350						**47,761,398**
40 to 44	2	55	107	172	157	57				**550**	
	112,608	4,575,120	9,596,238	16,159,092	16,365,048	6,539,514					**53,347,620**
45 to 49	1	5	30	205	318	240	4			**803**	
	56,304	402,144	2,705,682	19,079,808	32,522,130	27,194,256	435,390				**82,395,714**
50 to 54		2	3	153	210	169	138	121		**796**	
		173,496	273,240	14,197,698	21,145,950	18,489,240	16,500,822	15,136,410			**85,916,856**
55 to 59		1		65	103	146	152	85	17	**569**	
		68,616		5,978,808	10,148,874	15,514,536	18,428,244	10,793,436	2,351,028		**63,283,542**
60 to 64				12	21	34	37	23	55	**182**	
				1,091,484	2,099,520	3,581,586	4,114,536	2,644,680	7,206,012		**20,737,818**
65 and over				2			3		2	**7**	
				188,244			361,872		281,940		**832,056**
W/O DOB										**0**	
											0
Total Active	**138**	**674**	**445**	**778**	**810**	**646**	**334**	**229**	**74**	**4,128**	
Annual Salary[1]	**$7,769,952**	**$53,634,996**	**$40,040,298**	**$72,682,848**	**$82,384,872**	**$71,319,132**	**$39,840,864**	**$28,574,526**	**$9,838,980**		**$ 406,086,468**

[1] *The number of participants and annual salary listed includes information on active participants only. Hence, information on the four male ordinary disability participants, who continue to earn benefit service, is not included in this exhibit. Excludes duty availability pay.*

Exhibit C

Part II – Total Lives and Annual Salaries of Active Female Participants Classified by Age and Years of Service as of December 31, 2018

	Years of Service										
AGE	Under 1 year	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 and over	Total	Annual Salary
Under 20										**0**	
											$ 0
20 to 24										**0**	
											0
25 to 29	7	4								**11**	
	394,128	311,790									**705,918**
30 to 34	9	38	13	1						**61**	
	506,736	3,065,370	1,164,720	94,122							**4,830,948**
35 to 39	2	26	30	5	2					**65**	
	112,608	2,171,070	2,653,776	463,848	209,154						**5,610,456**
40 to 44	1	5	15	15	19					**55**	
	56,304	413,292	1,353,954	1,441,416	2,111,844						**5,376,810**
45 to 49	2	2	2	13	19	9				**47**	
	112,608	173,496	182,160	1,200,570	2,031,642	1,007,832					**4,708,308**
50 to 54				8	18	15	18	5		**64**	
				786,726	1,879,104	1,737,900	2,192,994	655,920			**7,252,644**
55 to 59				2	13	3	13	5		**36**	
				186,396	1,269,354	318,768	1,601,070	719,196			**4,094,784**
60 to 64				1	3	3	4	1	1	**13**	
				87,006	288,408	328,452	523,080	128,970	185,352		**1,541,268**
65 and over								1		**1**	
								162,240			**162,240**
W/O DOB										**0**	
											0
Total Active	**21**	**75**	**60**	**45**	**74**	**30**	**35**	**12**	**1**	**353**	
Annual Salary[1]	**$1,182,384**	**$6,135,018**	**$5,354,610**	**$4,260,084**	**$7,789,506**	**$3,392,952**	**$4,317,144**	**$1,666,326**	**$185,352**		**$ 34,283,376**

[1] *The number of participants and annual salary listed includes information on active participants only. Hence, information on the two female ordinary disability participants, who continues to earn benefit service, is not included in this exhibit. Excludes duty availability pay.*

Exhibit C
Part III – Total Lives and Annual Salaries of All Active Participants Classified by Age and Years of Service as of December 31, 2018

	Years of Service										
AGE	Under 1 year	1 to 4	5 to 9	10 to 14	15 to 19	20 to 24	25 to 29	30 to 34	35 and over	Total	Annual Salary
Under 20										0	$ 0
20 to 24	26	22								48	
	1,463,904	1,643,730									3,107,634
25 to 29	53	149								202	
	2,984,112	11,261,388									14,245,500
30 to 34	51	280	120	41						492	
	2,871,504	22,470,672	10,800,756	3,852,264							39,995,196
35 to 39	23	228	228	134	3					616	
	1,294,992	18,588,060	20,482,878	12,693,420	312,504						53,371,854
40 to 44	3	60	122	187	176	57				605	
	168,912	4,988,412	10,950,192	17,600,508	18,476,892	6,539,514					58,724,430
45 to 49	3	7	32	218	337	249	4			850	
	168,912	575,640	2,887,842	20,280,378	34,553,772	28,202,088	435,390				87,104,022
50 to 54		2	3	161	228	184	156	126		860	
		173,496	273,240	14,984,424	23,025,054	20,227,140	18,693,816	15,792,330			93,169,500
55 to 59		1		67	116	149	165	90	17	605	
		68,616		6,165,204	11,418,228	15,833,304	20,029,314	11,512,632	2,351,028		67,378,326
60 to 64				13	24	37	41	24	56	195	
				1,178,490	2,387,928	3,910,038	4,637,616	2,773,650	7,391,364		22,279,086
65 and over				2			3	1	2	8	
				188,244			361,872	162,240	281,940		994,296
W/O DOB										0	
											0
Total Active	**159**	**749**	**505**	**823**	**884**	**676**	**369**	**241**	**75**	**4,481**	
Annual Salary[1]	**$8,952,336**	**$59,770,014**	**$45,394,908**	**$76,942,932**	**$90,174,378**	**$74,712,084**	**$44,158,008**	**$30,240,852**	**$10,024,332**		**$ 440,369,844**

[1] *The number of participants and annual salary listed includes information on active participants only. Hence, information on the four male and two female ordinary disability participants, who continue to earn benefit service, is not included in this exhibit. Excludes duty availability pay.*

Exhibit D – Part I
Number of Refund Payments Made
During Year to Male Employees
For Fiscal Year Ending December 31, 2018 [1]

Age at Date of Refund	Length of Service at Date of Refund: Under 1 Year	Between 1 and 2	Between 2 and 3	Between 3 and 4	Between 4 and 5	5 and over	Total
Without Record							**0**
Under 20	4						**4**
20 to 24							**0**
25 to 29							**0**
30 to 34							**0**
35 to 39							**0**
40 to 44							**0**
45 to 49	1						**1**
50 to 54							**0**
55 to 59							**0**
60 & over							**0**
Totals	**5**	**0**	**0**	**0**	**0**	**0**	**5**

[1] *Includes only the actual number of refunds paid or accrued during fiscal year reported.*

Exhibit D – Part II
Number of Refund Payments Made During Year to Female Employees For Fiscal Year Ending December 31, 2018 [1]

Age at Date of Refund	Length of Service at Date of Refund: Under 1 Year	Between 1 and 2	Between 2 and 3	Between 3 and 4	Between 4 and 5	5 and over	Total
Without Record							**0**
Under 20	1						**1**
20 to 24							**0**
25 to 29							**0**
30 to 34							**0**
35 to 39							**0**
40 to 44							**0**
45 to 49							**0**
50 to 54							**0**
55 to 59							**0**
60 & over							**0**
Totals	**1**	**0**	**0**	**0**	**0**	**0**	**1**

[1] *Includes only the actual number of refunds paid or accrued during fiscal year reported.*

Exhibit E
Statistics on Service Retirement Annuities Classified by Age as of December 31, 2018

AGE	MALE No.	MALE Annual Payments	FEMALE No.	FEMALE Annual Payments	TOTAL No.	TOTAL Annual Payments
UNDER 50	0	$ 0	0	$ 0	**0**	**$ 0**
50	2	127,276	1	5,795	**3**	**133,072**
51	1	63,956	2	22,583	**3**	**86,539**
52	5	287,975	1	63,438	**6**	**351,413**
53	13	950,280	3	252,114	**16**	**1,202,394**
54	17	927,760	3	226,996	**20**	**1,154,755**
55	69	5,491,912	10	696,677	**79**	**6,188,589**
56	78	6,593,494	8	495,062	**86**	**7,088,556**
57	79	6,271,244	11	861,066	**90**	**7,132,310**
58	81	6,739,291	1	69,353	**82**	**6,808,644**
59	89	7,577,129	11	853,646	**100**	**8,430,775**
60	166	14,218,381	14	1,124,148	**180**	**15,342,529**
61	151	13,228,032	8	666,922	**159**	**13,894,954**
62	165	14,023,554	8	691,079	**173**	**14,714,634**
63	186	16,263,014	14	1,082,009	**200**	**17,345,023**
64	193	17,357,033	9	576,060	**202**	**17,933,093**
65	174	14,305,892	3	242,846	**177**	**14,548,737**
66	167	13,676,849	8	587,217	**175**	**14,264,066**
67	133	11,260,575	2	87,242	**135**	**11,347,817**
68	112	9,398,954	3	287,400	**115**	**9,686,354**
69	90	7,458,608	3	218,834	**93**	**7,677,441**
70	71	5,770,764	0	0	**71**	**5,770,764**
71	88	7,651,451	3	244,329	**91**	**7,895,780**
72	96	8,301,164	1	57,988	**97**	**8,359,152**
73	64	5,343,841	1	72,029	**65**	**5,415,870**
74	61	4,817,787	2	110,846	**63**	**4,928,633**
75	79	6,409,955	1	69,233	**80**	**6,479,188**
76	107	9,021,374	2	119,088	**109**	**9,140,462**
77	91	7,383,539	0	0	**91**	**7,383,539**
78	94	6,882,573	0	0	**94**	**6,882,573**
79	53	4,040,528	1	97,278	**54**	**4,137,806**
80	41	3,007,644	0	0	**41**	**3,007,644**
81	41	2,879,106	1	60,803	**42**	**2,939,909**
82	67	4,741,453	0	0	**67**	**4,741,453**
83	47	3,291,451	0	0	**47**	**3,291,451**
84	36	2,917,222	0	0	**36**	**2,917,222**
85	46	3,268,994	0	0	**46**	**3,268,994**
86	38	2,677,842	0	0	**38**	**2,677,842**
87	42	2,612,121	0	0	**42**	**2,612,121**
88	37	2,187,920	0	0	**37**	**2,187,920**
89	32	1,878,284	0	0	**32**	**1,878,284**
90	25	1,414,804	0	0	**25**	**1,414,804**
91	17	779,588	0	0	**17**	**779,588**
92	21	1,049,741	0	0	**21**	**1,049,741**
93	8	318,963	0	0	**8**	**318,963**
94	6	226,963	0	0	**6**	**226,963**
95+	8	297,798	0	0	**8**	**297,798**
Totals	**3,287**	**$265,394,078**	**135**	**$9,942,081**	**3,422**	**$275,336,159**

Exhibit F
Statistics on Widow's Annuities
Classified by Age as of December 31, 2018

Age	No. [1]	Annual Payments	Age	No. [1]	Annual Payments
Under 30	0	$ 0	63	14	$ 400,090
30	0	0	64	12	344,323
31	0	0	65	18	585,959
32	0	0	66	11	360,054
33	0	0	67	12	384,869
34	0	0	68	30	756,052
35	0	0	69	13	375,736
36	0	0	70	21	586,815
37	0	0	71	28	776,150
38	0	0	72	29	851,425
39	0	0	73	29	923,410
40	0	0	74	36	1,082,357
41	1	20,275	75	40	1,118,289
42	0	0	76	49	1,430,962
43	0	0	77	40	1,102,655
44	1	20,888	78	37	1,097,678
45	2	51,344	79	50	1,288,179
46	0	0	80	44	1,175,419
47	2	39,619	81	39	1,021,723
48	0	0	82	56	1,367,295
49	0	0	83	49	1,138,053
50	3	83,041	84	34	818,712
51	3	70,828	85	46	1,135,175
52	4	93,885	86	37	824,526
53	5	184,574	87	49	1,011,235
54	8	206,001	88	38	750,617
55	10	236,243	89	42	832,022
56	11	315,456	90	37	694,111
57	11	296,382	91	26	475,352
58	7	212,685	92	27	481,302
59	7	213,786	93	12	223,727
60	12	293,436	94	15	248,419
61	16	432,842	95+	39	633,384
62	19	591,528			
			Total	1,181	$29,658,889

[1] *Excludes Parent Annuitants and Compensation Annuitants.*

Exhibit G
Statistics on Miscellaneous Annuities
For Fiscal Year Ending December 31, 2018

	No.		Annual Payments
Children's Annuities	78	$	916,750
Widows' Compensation Annuities	81		6,117,105
Ordinary Disability Benefits	6		223,129
Occupational Disease Disability Benefits	89		5,826,305
Duty Disability Benefits	170		11,174,824
Parent Annuities	1		15,130
Totals	**425**	**$**	**24,273,243**

Exhibit H – Part I
Male Participants Receiving Duty Disability
Classified by Age and Length of Service as of December 31, 2018

	Length of Service as of December 31, 2018													
	Under 1 Year		1 to 4		5 to 9		10 to 14		15 to 19		20 & Over		Total	
ATTAINED AGE	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39					1	62,550							**1**	**62,550**
40 to 44					2	115,390							**2**	**115,390**
45 to 49			1	43,911	3	162,984	3	202,334	2	146,448	2	153,545	**11**	**709,221**
50 to 54			1	42,435	4	241,372	7	416,955	4	277,485	9	702,942	**25**	**1,681,190**
55 to 59			2	72,441	5	230,460	5	308,589	10	600,559	25	1,935,904	**47**	**3,147,954**
60 & over					6	270,087	7	348,353	7	418,500	35	2,729,599	**55**	**3,766,539**
Totals	0	$ 0	4	$ 158,787	21	$ 1,082,843	22	$ 1,276,231	23	$ 1,442,992	71	$ 5,521,990	141	$ 9,482,844

Exhibit H – Part II
Female Participants Receiving Duty Disability
Classified by Age and Length of Service as of December 31, 2018

	Length of Service as of December 31, 2018													
	Under 1 Year		1 to 4		5 to 9		10 to 14		15 to 19		20 & Over		Total	
ATTAINED AGE	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39													**0**	**0**
40 to 44							1	71,906					**1**	**71,906**
45 to 49									2	164,417			**2**	**164,417**
50 to 54			1	40,008			3	155,084	1	59,235	2	156,851	**7**	**411,178**
55 to 59			1	41,121	2	95,127	2	108,439	2	112,364	1	76,971	**8**	**434,022**
60 & over					3	137,013	4	186,486	1	67,146	3	219,812	**11**	**610,457**
Totals	0	$ 0	2	$ 81,129	5	$ 232,140	10	$ 521,915	6	$ 403,162	6	$ 453,634	29	$ 1,691,980

Exhibit I – Part I

Male Participants Receiving Ordinary Disability

Classified by Age and Length of Service as of December 31, 2018

	Length of Service as of December 31, 2018													
	Under 1 Year		1 to 4		5 to 9		10 to 14		15 to 19		20 & Over		Total	
ATTAINED AGE	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34					1	35,834							**1**	**35,834**
35 to 39			1	32,745	1	38,027							**2**	**70,772**
40 to 44													**0**	**0**
45 to 49													**0**	**0**
50 to 54							1	37,149					**1**	**37,149**
55 to 59													**0**	**0**
60 & over													**0**	**0**
Totals	**0**	**$ 0**	**1**	**$ 32,745**	**2**	**$ 73,861**	**1**	**$ 37,149**		**$ 0**	**0**	**$ 0**	**4**	**$ 143,755**

Exhibit I – Part II

Female Participants Receiving Ordinary Disability

Classified by Age and Length of Service as of December 31, 2018

	Length of Service as of December 31, 2018													
	Under 1 Year		1 to 4		5 to 9		10 to 14		15 to 19		20 & Over		Total	
ATTAINED AGE	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39													**0**	**0**
40 to 44							1	39,308					**1**	**39,308**
45 to 49													**0**	**0**
50 to 54													**0**	**0**
55 to 59													**0**	**0**
60 & over							1	40,066					**1**	**40,066**
Totals	**0**	**$ 0**	**0**	**$ 0**	**0**	**$ 0**	**2**	**$ 79,374**		**$ 0**	**0**	**$ 0**	**2**	**$ 79,374**

Exhibit J – Part I
Male Participants Receiving Occupational Disease Disability
Classified by Age and Length of Service as of December 31, 2018

	Length of Service as of December 31, 2018													
	Under 1 Year		1 to 4		5 to 9		10 to 14		15 to 19		20 & Over		Total	
ATTAINED AGE	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39	1	56,896											**1**	**56,896**
40 to 44	2	143,215											**2**	**143,215**
45 to 49	6	389,937											**6**	**389,937**
50 to 54	8	522,229					1	57,355					**9**	**579,584**
55 to 59	22	1,462,129					3	142,594	3	156,912	6	365,318	**34**	**2,126,953**
60 & over	9	656,114							3	158,937	15	1,002,824	**27**	**1,817,875**
Totals	**48**	**$ 3,230,520**	**0**	**$ 0**	**0**	**$ 0**	**4**	**$ 199,949**	**6**	**$ 315,849**	**21**	**$ 1,368,142**	**79**	**$ 5,114,460**

Exhibit J – Part II
Female Participants Receiving Occupational Disease Disability
Classified by Age and Length of Service as of December 31, 2018

	Length of Service as of December 31, 2018													
	Under 1 Year		1 to 4		5 to 9		10 to 14		15 to 19		20 & Over		Total	
ATTAINED AGE	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments	No.	Annual Payments
UNDER 30													**0**	**$ 0**
30 to 34													**0**	**0**
35 to 39													**0**	**0**
40 to 44	2	155,534											**2**	**155,534**
45 to 49	1	67,869											**1**	**67,869**
50 to 54							1	45,303					**1**	**45,303**
55 to 59	3	209,956											**3**	**209,956**
60 & over					1	47,340					2	185,843	**3**	**233,183**
Totals	**6**	**$ 433,359**	**0**	**$ 0**	**1**	**$ 47,340**	**1**	**$ 45,303**		**$ 0**	**2**	**$ 185,843**	**10**	**$ 711,845**

Exhibit K
History of Average Annual Salaries

Year End	Members in Service[1]	Increase	Current Year Salary	Increase	Average Salary	Increase	Actuarial Assumption	CPI Chicago
1989	5,231	0.0 %	$ 194,241,480	3.3 %	$ 37,133	3.3 %	6.00%	5.0 %
1990	5,337	2.0 %	211,869,720	9.1 %	39,698	6.9 %	6.00%	5.4 %
1991	5,323	(0.3)%	227,649,000	7.4 %	42,767	7.7 %	6.00%	4.0 %
1992	5,204	(2.2)%	223,578,000	(1.8)%	42,963	0.5 %	6.00%	3.0 %
1993	5,124	(1.5)%	221,600,136	(0.9)%	43,247	0.7 %	6.00%	3.0 %
1993 [2]	4,710	(8.1)%	202,080,072	(8.8)%	42,904	(0.8)%	6.00%	3.0 %
1994	4,753	0.9 %	226,703,496	12.2 %	47,697	11.2 %	6.00%	2.2 %
1995	4,678	(1.6)%	228,604,584	0.8 %	48,868	2.5 %	6.00%	3.2 %
1996	4,806	2.7 %	233,033,832	1.9 %	48,488	(0.8)%	6.00%	2.7 %
1997	4,856	1.0 %	234,726,936	0.7 %	48,338	(0.3)%	5.00%	2.7 %
1998	4,783	(1.5)%	262,248,978	11.7 %	54,829	13.4 %	5.00%	1.5 %
1999	4,855	1.5 %	271,335,540	3.5 %	55,888	1.9 %	5.00%	2.6 %
2000	4,878	0.5 %	275,106,756	1.4 %	56,397	0.9 %	5.00%	4.0 %
2001	4,930	1.1 %	277,964,912	1.0 %	56,382	0.0 %	5.00%	0.8 %
2002	4,910	(0.4)%	277,053,144	(0.3)%	56,426	0.1 %	5.00%	2.5 %
2003	4,909	0.0 %	335,170,501	21.0 %	68,277	21.0 %	5.00%	1.7 %
2004	4,856	(1.1)%	334,423,753	(0.2)%	68,868	0.9 %	5.00%	2.2 %
2005	4,999	2.9 %	341,252,492	2.0 %	68,264	(0.9)%	5.00%	3.6 %
2006	5,078	1.6 %	387,442,074	13.5 %	76,298	11.8 %	5.00%	0.7 %
2007	4,938	(2.8)%	388,881,954	0.4 %	78,753	3.2 %	5.00%	4.7 %
2008	5,037	2.0 %	396,181,778	1.9 %	78,654	(0.1)%	5.00%	(0.6)%
2009	5,137	2.0 %	400,912,173	1.2 %	78,044	(0.8)%	5.00%	2.5 %
2010	5,052	(1.7)%	400,404,320	(0.1)%	79,257	1.6 %	5.00%	1.2 %
2011	4,842	(4.2)%	425,385,354	6.2 %	87,853	10.8 %	5.00%	2.1 %
2012	4,740	(2.1)%	418,964,763	(1.5)%	88,389	0.6 %	5.00%	1.7 %
2013	4,685	(1.2)%	416,491,784	(0.6)%	88,899	0.6 %	4.25%	0.5 %
2014	4,809	2.6 %	443,743,202	6.5 %	92,273	3.8 %	4.25%	1.5 %
2015	4,735	(1.5)%	449,037,894	1.2 %	94,834	2.8 %	3.75%	0.0 %
2016	4,760	0.5 %	461,906,144	2.9 %	97,039	2.3 %	3.75%	1.9 %
2017 [3]	4,613	0.0 %	452,800,481	(2.0)%	98,157	1.2 %	3.75%	1.7 %
2018 [3]	4,487	(2.7)%	440,816,101	(2.6)%	98,243	0.1 %	3.50%	1.1 %
Average Increase (Decrease) for the last 5 years:		**(0.2)%**		**1.2 %**		**2.0 %**		**1.2 %**

[1] *Includes those members who were on disability through 1993.*
[2] *Restated without disabilities for comparison. Percent increases (decreases) are based on change from with disabilities in 1993 to without disabilities in 1994.*
[3] *Average annual increase in average salary 1989-2018, is about 3.3% compounded. The average annual increase in the Chicago CPI for the same period is about 2.3% compounded.*

Exhibit L
New Annuities Granted during 2018

	Annuitants	Widows/ Widowers of Deceased Employees[2]	Widows/ Widowers of Deceased Annuitants	Compensation Widows/ Widowers[3]
Number retired/deceased	277	4	63	0
Average age attained [Employee]	58.6	56.8	80.4	0.0
Average length of service	29.9	34.3	51.6	0.0
Average spouse age	57.1	58.5	76.8	0.0
Average annual salary [4 out of 10]	$ 116,740	N/A	N/A	N/A
Average annual final salary	$ 119,358	N/A	N/A	N/A
Total annual annuity	$ 23,250,690	167,152	2,241,101	0
Average annual annuity	$ 83,938	41,788	35,573	N/A
Total statutory liability	421,012,734	2,340,895	17,802,516	N/A
Average liability	1,519,902	585,224	282,580	N/A
Total investment [Employee-paid for tax purposes]	$ 49,482,910	N/A	N/A	N/A
Average investment [1]	$ 178,639	N/A	N/A	N/A
Liability/cost	8.51	N/A	N/A	N/A
Liability/final pay	12.73	N/A	N/A	N/A

[1] *Based on previously taxed contributions.*
[2] *Not including compensation or supplemental.*
[3] *Does not include transfers from Supplemental Widows.*

Exhibit M
Retirees and Beneficiaries by Type of Benefit

Years	ANNUITANTS						DISABILITY			Widow/ Widower	Total
	Employee	Disability Pensioner	Spouse	Supplemental Widow(er)	Child	Parent	Ordinary	Duty	Occup.	Comp.	
1989	2,235	1	1,237	68	108	1	8	235	122	55	4,070
1990	2,242	0	1,248	67	106	1	11	253	133	51	4,112
1991	2,226	0	1,264	65	121	1	14	267	143	49	4,150
1992	2,261	0	1,277	68	113	1	11	286	147	40	4,204
1993	2,257	0	1,291	69	114	1	10	274	140	35	4,191
1994	2,207	0	1,316	66	114	2	6	284	142	36	4,173
1995	2,248	0	1,332	62	110	1	8	297	144	40	4,242
1996	2,257	0	1,328	61	110	1	8	292	169	44	4,270
1997	2,235	0	1,348	60	111	1	11	296	194	46	4,302
1998	2,251	0	1,360	56	125	2	8	295	197	49	4,343
1999	2,351	0	1,450	56	139	2	5	295	203	49	4,550
2000	2,538	0	1,440	51	132	2	6	257	139	49	4,614
2001 [1]	2,422	0	1,330	0	116	2	2	262	147	89	4,370
2002	2,411	0	1,330	0	121	1	2	257	144	85	4,351
2003	2,412	0	1,322	0	119	1	3	249	121	82	4,309
2004	2,441	0	1,352	0	114	1	7	244	113	81	4,353
2005	2,442	0	1,330	0	111	1	7	254	107	105	4,357
2006	2,459	0	1,322	0	110	1	6	257	113	114	4,382
2007	2,488	0	1,300	0	105	1	4	266	114	113	4,391
2008	2,471	0	1,306	0	98	1	4	269	124	108	4,381
2009	2,556	0	1,292	0	89	1	4	262	121	107	4,432
2010	2,577	0	1,261	0	83	1	4	259	124	100	4,409
2011	2,665	0	1,253	0	85	1	4	249	121	100	4,478
2012	2,821	0	1,260	0	83	1	2	232	116	98	4,613
2013	2,883	0	1,242	0	83	1	2	220	112	99	4,642
2014	2,977	0	1,222	0	82	1	1	220	108	93	4,704
2015	3,044	0	1,198	0	79	1	3	212	107	88	4,732
2016	3,130	0	1,175	0	84	1	3	202	100	85	4,780
2017	3,257	0	1,181	0	79	1	8	190	86	84	4,886
2018	3,422	0	1,181	0	78	1	6	170	89	81	5,028

[1] *In 2001 all Supplemental Widows were moved into the Compensation Widows Group.*

Exhibit N
Average Employee Retirement Benefits Payable

Years Ended	Average Annual Benefit	Average Current Age of Retirees	Average Annual Benefit at Retirement Current Year	Average Age at Retirement Current Year	Average Years of Service at Retirement Current Year
1989	$ 19,732	68	$ 29,967	60.4	31.1
1990	20,853	68	30,038	60.3	30.9
1991	21,942	69	30,983	60.0	31.4
1992	23,503	69	32,758	59.9	31.3
1993	25,031	69	34,267	61.6	31.7
1994	26,262	70	34,391	59.8	31.2
1995	27,935	70	38,872	60.3	32.1
1996	29,304	70	40,406	60.4	32.0
1997	30,787	70	41,543	59.8	31.6
1998	32,503	71	43,905	60.1	32.1
1999	34,067	71	44,001	60.4	31.4
2000	36,458	71	48,534	63.5	34.2
2001	38,048	71	45,768	60.2	30.9
2002	40,052	71	45,346	59.7	30.8
2003	42,131	71	50,943	60.2	31.7
2004	45,675	71	59,608	60.0	32.1
2005	47,917	71	59,117	59.2	31.4
2006	50,171	71	61,172	57.7	30.1
2007	52,446	71	64,076	58.1	30.0
2008	54,492	71	61,577	57.4	29.6
2009	57,023	71	67,310	57.8	30.3
2010	59,133	71	67,386	59.0	29.7
2011	61,879	71	70,893	58.5	29.4
2012	64,860	70	75,675	58.5	30.4
2013	67,286	70	73,808	57.6	30.2
2014	69,977	70	78,042	57.4	30.5
2015	71,823	70	73,541	58.4	28.7
2016	74,125	70	78,725	58.6	29.6
2017	77,904	69	82,815	58.4	30.4
2018	80,461	69	83,938	58.6	29.9

Exhibit O – Part I
History of Annuities 1989-2018
Employee Annuitants (Male and Female)

Year End	Number of Annuitants	Total Annuities	Average Annuities
1989	2,235	$ 44,101,893	$ 19,732
1990	2,242	46,752,084	20,853
1991	2,226	48,843,715	21,942
1992	2,261	53,140,074	23,503
1993	2,257	56,495,862	25,031
1994	2,207	57,960,522	26,262
1995	2,248	62,797,419	27,935
1996	2,257	66,139,690	29,304
1997	2,235	68,808,890	30,787
1998	2,251	73,163,601	32,503
1999	2,351	80,090,897	34,067
2000	2,538	92,529,624	36,458
2001	2,422	92,152,832	38,048
2002	2,411	96,565,842	40,052
2003	2,412	101,620,962	42,131
2004	2,441	111,491,737	45,675
2005	2,442	117,014,053	47,917
2006	2,459	123,371,713	50,171
2007	2,488	130,485,435	52,446
2008	2,471	134,649,295	54,492
2009	2,556	145,751,375	57,023
2010	2,577	152,385,721	59,133
2011	2,665	164,908,801	61,879
2012	2,821	182,970,558	64,860
2013	2,883	193,984,459	67,286
2014	2,977	208,322,397	69,977
2015	3,044	218,628,245	71,823
2016	3,130	232,010,024	74,125
2017	3,257	253,734,772	77,904
2018	3,422	275,336,159	80,461

Exhibit O – Part II
History of Annuities 1989-2018
Widow/Widower Annuitants
(Including Parent but Not Compensation Annuitants)

Year End	Number of Annuitants	Total Annuities	Average Annuities
1989	1,319	$ 7,743,932	$ 5,871
1990	1,316	8,031,199	6,103
1991	1,330	9,316,132	7,005
1992	1,346	10,774,709	8,005
1993	1,361	12,121,722	8,906
1994	1,384	13,680,765	9,885
1995	1,395	14,495,633	10,391
1996	1,389	14,709,232	10,590
1997	1,409	15,397,832	10,928
1998	1,418	15,969,975	11,262
1999	1,508	18,136,173	12,027
2000	1,493	18,352,906	12,293
2001	1,332	16,516,021	12,399
2002	1,331	17,006,519	12,777
2003	1,323	17,490,584	13,220
2004	1,353	19,297,527	14,263
2005	1,331	20,481,794	15,388
2006	1,323	21,123,202	15,966
2007	1,301	21,290,764	16,365
2008	1,307	22,164,269	16,958
2009	1,293	22,652,897	17,520
2010	1,262	22,832,364	18,092
2011	1,254	23,449,616	18,700
2012	1,261	24,681,837	19,573
2013	1,243	25,252,147	20,315
2014	1,223	25,524,937	20,871
2015	1,199	26,048,384	21,725
2016	1,176	26,436,619	22,480
2017	1,182	28,637,750	24,228
2018	1,182	29,674,018	25,105

Exhibit P
History of Retirees and Beneficiaries
Added to and Removed from Benefit Payroll

Yr.	Added No.	Added Annual Benefits.	Removed No.	Removed Annual Benefits	End of Year No.	End of Year Annual Benefits	Average Annual Benefits	Increase to Avg. Benefits
Employee Annuitants (Male and Female)								
2004	147	$14,053,559	118	$4,182,784	2,441	$111,491,737	$45,675	8.4%
2005	126	10,248,119	125	4,725,803	2,442	117,014,053	47,917	4.9
2006	123	10,689,546	106	4,331,886	2,459	123,371,713	50,171	4.7
2007	126	11,168,192	97	4,054,470	2,488	130,485,435	52,446	4.5
2008	109	9,696,869	126	5,533,009	2,471	134,649,295	54,492	3.9
2009	185	15,610,755	100	4,508,675	2,556	145,751,375	57,023	4.6
2010	117	11,242,038	96	4,607,692	2,577	152,385,721	59,133	3.7
2011	197	18,074,820	109	5,551,740	2,665	164,908,801	61,879	4.6
2012	275	24,560,716	119	6,498,959	2,821	182,970,558	64,860	4.8
2013	187	17,780,058	125	6,766,157	2,883	193,984,459	67,286	3.7
2014	211	20,629,503	117	6,291,565	2,977	208,322,397	69,977	4.0
2015	175	17,023,263	108	6,717,414	3,044	218,628,245	71,823	2.6
2016	199	20,036,064	113	6,654,286	3,130	232,010,024	74,125	3.2
2017	252	29,720,953	125	7,996,204	3,257	253,734,772	77,904	5.1
2018	278	29,352,500	113	7,751,113	3,422	275,336,159	80,461	8.5
Widow/Widower Annuitants (Not Including Compensation)								
2004	92	$2,595,350	62	$788,407	1,353	$19,297,527	$14,263	7.9%
2005	94	2,596,899	116	1,412,632	1,331	20,481,794	15,388	7.9
2006	84	1,964,568	92	1,323,160	1,323	21,123,202	15,966	3.8
2007 [1]	59	1,341,091	81	1,173,529	1,301	21,290,764	16,365	2.5
2008 [1]	77	1,796,751	71	923,246	1,307	22,164,269	16,958	3.6
2009 [1]	66	1,605,852	80	1,117,224	1,293	22,652,897	17,520	3.3
2010 [1]	55	1,404,275	86	1,224,808	1,262	22,832,364	18,092	3.3
2011 [1]	62	1,661,849	70	1,044,597	1,254	23,449,616	18,700	3.4
2012 [1]	79	2,361,949	72	1,129,728	1,261	24,681,837	19,573	4.7
2013 [1]	71	2,032,935	89	1,462,625	1,243	25,252,147	20,315	3.8
2014 [1]	59	1,675,707	79	1,402,917	1,223	25,524,937	20,871	2.7
2015 [1]	61	2,029,302	85	1,505,855	1,199	26,048,384	21,725	4.1
2016 [1]	64	2,523,786	87	1,612,104	1,176	26,436,619	22,480	3.5
2017 [1]	83	3,605,382	77	1,404,251	1,182	28,637,750	24,228	7.8
2018 [1]	71	4,644,122	71	1,406,722	1,182	29,674,018	25,105	3.6

[1] *Including Parent Annuitants but not Compensation Annuitants.*

APPENDIX 4

ACTUARIAL METHODS AND ASSUMPTIONS AS OF DECEMBER 31, 2018

ACTUARIAL COST METHOD

An Actuarial Cost Method is a set of techniques used by the actuary to develop contribution levels under a retirement plan. The Actuarial Cost Method used in this actuarial valuation for statutory funding and State reporting purposes and GASB accounting purposes is the Entry Age Normal cost method.

Under the Entry Age Normal cost method, each participant's projected benefit is allocated on a level percent of pay basis from entry age to assumed exit age. The Actuarial Accrued Liability is the portion of the present value of benefits associated with pay prior to the actuarial valuation date. The Normal Cost is the present value of benefits associated with pay during the current plan year.

To the extent that current assets are less than the Actuarial Accrued Liability, an Unfunded Actuarial Accrued Liability ("UAAL") develops. The UAAL is generally amortized over a fixed period of time (e.g., 30 years) from the date incurred. The total contribution developed under this method is the sum of the Normal Cost and the payment toward the UAAL.

CURRENT ACTUARIAL ASSUMPTIONS

The current demographic actuarial assumptions were adopted and became effective December 31, 2017, and were based on results of the experience study performed for the period January 1, 2012 through December 31, 2016. Based on the December 31, 2018 Economic Assumption Review, the economic actuarial assumptions were adopted and became effective December 31, 2018. Key economic actuarial assumption changes include decreasing the discount rate and investment return assumption from 7.50% to 6.75%, decreasing the wage inflation rate from 3.75% to 3.50%, and decreasing the general inflation rate from 2.50% to 2.25%.

Demographic Assumptions

Mortality:

Post-Retirement Mortality: Scaling factors of 106 percent for males, and 98 percent for females of the RP-2014 Blue Collar Healthy Annuitant mortality table, sex distinct, with generational mortality improvement using MP-2017 2-dimensional mortality improvement scales recently released by the SOA. This assumption provides a margin for mortality improvements.

Disabled Mortality: Scaling factors of 107 percent for males, and 99 percent for females of the RP-2014 Blue Collar Healthy Annuitant mortality table, sex distinct, with generational mortality improvement using MP-2017 2-dimensional mortality improvement scales recently released by the SOA. This assumption provides a margin for mortality improvements.

Pre-Retirement Mortality: Scaling factors of 92 percent for males, and 100 percent for females of the RP-2014 Blue Collar Employee mortality table, sex distinct, with generational mortality improvement using MP-2017 2-dimensional mortality improvement scales recently released by the SOA. This assumption provides a margin for mortality improvements.

Future mortality improvements in pre- and post-retirement mortality are reflected by projecting the base mortality tables back from the year 2014 to the year 2006 using the MP-2014 projection scale and projecting from 2006 using the MP-2017 projection scale.

	Future Life Expectancy (years) in 2018		Future Life Expectancy (years) in 2030	
	Post-Retirement		Pos-Rretirement	
Age	Male	Female	Male	Female
35	47.57	51.82	48.90	53.04
40	42.47	46.58	43.75	47.78
45	37.46	41.44	38.70	42.61
50	32.56	36.39	33.77	37.53
55	27.83	31.47	29.00	32.58
60	23.34	26.77	24.42	27.81
65	19.14	22.29	20.11	23.23
70	15.27	18.01	16.11	18.88
75	11.73	14.04	12.48	14.84

Rate of Retirement: The tables below show the assumed rates of retirement.

	Hired before January 1, 2011		Hired on or after January 1, 2011	
Attained Age	Firefighters Rates	Paramedic Rates	Firefighters Rates	Paramedic Rates
50	0.02	0.03	0.01	0.01
51	0.02	0.03	0.01	0.01
52	0.02	0.03	0.01	0.01
53	0.02	0.04	0.01	0.01
54	0.04	0.08	0.01	0.01
55	0.12	0.08	0.13	0.08
56	0.12	0.10	0.13	0.10
57	0.13	0.10	0.14	0.10
58	0.13	0.12	0.14	0.12
59	0.16	0.12	0.16	0.12
60	0.20	0.15	0.20	0.15
61	0.25	0.15	0.25	0.15
62	0.60	0.20	0.60	0.20
63	1.00	0.30	1.00	0.30
64		0.40		0.40
65		1.00		1.00

Rate of Termination: The following are sample rates from the table:

Years of Service	Rate
0	0.020
1	0.008
2-8	0.006
9-13	0.005
14-29	0.004
30+	0.000

Rate of Disability: The rate at which members are assumed to become disabled under the provisions of the Fund. The rates assumed are as follows:

Attained Age	Rates
20-24	0.0009
25-29	0.0009
30-34	0.0010
35-39	0.0010
40-44	0.0018
45-49	0.0038
50-54	0.0106
55-59	0.0208
60-63	0.0250

Of the participants who become disabled, 55 percent are assumed to be duty disability, 40 percent are assumed to be occupational disease disability and 5 percent are assumed to be ordinary disability.

Economic Assumptions

Investment Return: 6.75 percent per year, compounded annually, net of investment expenses. The 6.75 percent assumption is composed of a 2.25 percent inflation assumption and a 4.50 percent real rate of return assumption. This assumption is first effective with the December 31, 2018, actuarial valuation.

General Inflation: 2.25 percent per year, compounded annually.

This assumption serves as the basis for the determination of annual increases in pension and the pensionable salary cap for Tier Two members.

Wage Inflation and Payroll Growth: 3.50 percent per year, compounded annually.

Future Salary Increases: The assumed base rate of individual salary increase is 3.50 percent per year (underlying wage inflation assumption), plus an additional percentage based on the following service scale:

Years of Service	Base Rates	Wage Inflation	Total Rates
0	21.50%	3.50%	25.00%
1	9.50%	3.50%	13.00%
2	5.75%	3.50%	9.25%
3	4.75%	3.50%	8.25%
4	4.75%	3.50%	8.25%
5	0.50%	3.50%	4.00%
6-8	0.00%	3.50%	3.50%
9	3.25%	3.50%	6.75%
10-13	0.00%	3.50%	3.50%
14	3.25%	3.50%	6.75%
15-18	0.00%	3.50%	3.50%
19	3.75%	3.50%	7.25%
20-23	0.00%	3.50%	3.50%
24	3.00%	3.50%	6.50%
25-28	0.00%	3.50%	3.50%
29	1.25%	3.50%	4.75%
30 and Over	0.00%	3.50%	3.50%

Asset Value: For State reporting, the actuarial value of assets is smoothed by using a five-year phase-in of each year's unexpected investment gains and losses on the market value.

For the GASB Statement Nos. 67 and 68 Actuarially Determined Contribution, the actuarial value of assets is smoothed by using a five-year average market value.

Expenses: Future administrative expenses are assumed to increase at the assumed inflation assumption of 2.25 percent.

Other Assumptions and Provisions

Marital Status: It is assumed that 75 percent of active members have an eligible spouse. The male spouse is assumed to be three years older than the female spouse. No assumption is made about other dependents.

Reciprocal Service: No assumption for reciprocal service.

Military Service: No assumption for military service.

Benefit Service: Exact fractional years of service are used to determine the amount of benefit payable. After a participant has 20 years of service, future benefit service is increased to the nearest integer.

Decrement Timing: All decrements are assumed to occur mid-year.

Decrement Relativity: Decrement rates are used directly, without adjustment for multiple decrement table effects.

Decrement Operation: Turnover decrements do not operate after member reaches retirement eligibility for a minimum annuity formula benefit.

Eligibility Testing: Eligibility for benefits is determined based upon the age nearest birthday and service on the date the decrement is assumed to occur.

Pay Increase Timing: Beginning of the (fiscal) year.

Beneficiary COLA Approximation: For current retirees, benefits for future survivors were increased by 35% to approximate the value of COLA benefits earned prior to the retirees death.

Actuarial Methods and Assumptions
As of December 31, 2018

Projection Assumptions

Active Population: Active members who terminate, retire, become disabled or die during the year are replaced by new entrants such that the number of active members remains level during the projection period based on the most recent actuarial valuation. The number of active members as of the actuarial valuation at December 31, 2018, is 4,487.

New Entrant Profile: The entry age of future new entrants, which is summarized below, is based on the profile of current active members hired over the last five years with one or more years of service as of December 31, 2018. These members were hired from January 1, 2014 through December 31, 2017. The group hired due to the Lewis Settlement was excluded from the development of the new entrant profile.

Entry Age	Number
Less than 25	85
25 to 30	270
30 to 35	275
35 to 40	91
40 to 45	8
45 and Over	5

Approximately 90 percent of the new entrants are assumed to be male.

New Entrant Pay: Based on the most recent employment contract, new entrants were assumed to earn $56,304 for the plan year ending December 31, 2019. The new entrant pay for members hired after 2019 is assumed to increase by the wage inflation assumption of 3.50 percent.

New Entrant Pay Increases: Pay for a specific new entrant is assumed to increase in the future by the wage inflation and the service based salary increase assumptions.

The projections assume a pay cap of $113,644.91 for plan year 2018, and a pay cap of $114,951.83 for plan year 2019, increasing by 1.125 percent per year after plan year 2018. The annual increase of 1.125 percent per year is based on 50 percent of the CPI-U increase which is assumed to be 2.25 percent per year.

APPENDIX 5

SUMMARY OF PROVISIONS OF THE FUND AS OF DECEMBER 31, 2018

Summary of
Principal Eligibility and Benefit Provisions
As of December 31, 2018

Participants

Person employed by the City of Chicago in its fire service as firefighter, fire paramedic, fire engineer, marine engineer or fire pilot, whose duty it is to participate in the work of controlling and extinguishing fire at the location of any such fire, whether or not he is assigned to fire service other than the actual extinguishing of fire.

Service

In computing service, the following periods shall be counted:

All periods of active service, vacation, leave of absence with whole or part pay, military service, periods of disability for which he receives disability benefit and leave of absence without pay to perform the duties of a member of the General Assembly prior to January 9, 1997. It is computed on a day-to-day basis. Employees may purchase the 1980-strike time and periods of suspension less than one year. Employees may purchase, with 4 percent interest, periods of employment of the Chicago Fire Department from 1970 until the employee entered this fund.

Retirement Annuity

Eligibility
For participants who first became members before January 1, 2011, attainment of age 50 with at least 10 years of service.

For participants who first became members on or after January 1, 2011, attainment of age 55 with at least 10 years of service. Participants may retire at attainment of age 50 with 10 years of service with a reduced benefit.

Mandatory
Retirement is mandatory for a participant who has attained age 63, except for emergency medical technicians.

Accumulation Annuity
At age 50 or more, with 10 or more years of service, the employee is entitled to an annuity based on the sums accumulated for age and service annuity plus 1/10 of the sum accumulated from the contributions by the City for the age and service annuity for each completed year of service after the first 10 years. At age 50 or more with 20 or more years or at age 63, the employee is entitled to an annuity based on all sums accumulated to his or her credit. The maximum is 75 percent of highest salary.

Minimum Formula Annuity
If the employee has 20 or more years of service (the annuity will begin no earlier than age 50), he or she is entitled to the following annuity: 50 percent plus 2.5 percent of the final average salary for each year or fraction of service over twenty years. Maximum is 75 percent of the final average salary.

Summary of
Principal Eligibility and Benefit Provisions
As of December 31, 2018

Retirement at Age 63 with Less than 20 Years of Service[1]
An employee who reaches compulsory retirement age with less than 20 years but greater than 10 years of service shall be entitled to a minimum annuity equal to 30 percent of final average salary for the first 10 years of service plus an additional 2 percent for each year in excess of 10, not to exceed 50 percent of final average salary.

Minimum Annuity
The minimum monthly annuity is the greater of $1,050 or 125% of the Federal Poverty Level if the firefighter retired at age 50 or over with at least 20 years of service.

For participants who first became members on or after January 1, 2011, the member is entitled to an annuity based on an accrual rate of 2.5 percent of the final average salary for each fraction of service. Maximum is 75 percent of the final average salary. Final average salary is calculated using salary from the eight highest consecutive years within the last 10 years of service prior to retirement. Pensionable salary is limited to $106,800 in 2011, increased by the lesser of 3 percent and one-half of the annual unadjusted percentage increase in the Consumer Price Index-U (but not less than zero) as measured in the preceding 12-month period ending with the September preceding the November 1, which is the date that the new amount will be calculated and made available to the pension funds.

For participants who first became members on or after January 1, 2011, who retire after age 50 but before age 55 is attained, the member is entitled to an annuity based on an accrual rate of 2.5 percent of the final average salary for each fraction of service, reduced by one half of one percent per month for retirement prior to age 55, subject to a maximum benefit of 75 percent.

Automatic Increase in Annuity
If an employee qualifies for a minimum formula annuity, 1.5 percent of the original annuity, starting on the first of the month one year after retirement or the first of the month following attainment of age 60 (age 55 if born before January 1, 1966, effective November 29, 2016), whichever is later, with a maximum of 30 percent (20 years). Such increases shall be 3 percent for firefighters born before January 1, 1966, (effective November 29, 2016) and such firefighters shall not be subject to the 30 percent maximum increase.

For participants who first became members on or after January 1, 2011, increases are equal to the lesser of 3.00 percent and 50 percent of CPI-U of the original benefit, commencing at age 60.

Widow/Widower Annuity

Payable until remarriage if widow/widower remarries before age 60, except Compensation and Supplemental Annuities. If the annuity is suspended because the widow/widower remarries before age 60, annuity payments will be resumed if the subsequent marriage ends. Any widow/widower's annuity,

[1] Between January 1994 and December 2000, benefits have been administered as if there were no compulsory retirement age. Beginning December 2000 benefits have been administered as if age 63 is the compulsory retirement age for non-EMT participants and there is no compulsory retirement age for EMT participants.

which was suspended on account of remarriage prior to December 31, 1989, will be resumed, if subsequent marriage ends, the later of July 14, 1995, or when the marriage ended. Beginning January 16, 2004, widows retain their rights to benefits after remarriage at any age. Benefits are not available to a widow of a fireman who received a refund of contributions for widow's benefits, unless the refund is repaid with 4 percent interest per year.

Death in Service (Non-Duty)

(1) If the firefighter dies with at least 1.5 years of service, 30 percent of the salary attached to the rank of a first class firefighter in the classified career service at the time of the firefighter's death; or,

(2) 50 percent of the annuity the deceased firefighter would have received if he had retired just prior to the date of death; or,

(3) Money purchase based on the total salary deductions and City contributions for age and service annuity and widow/widower's annuity.

(4) The widow of an active fireman with 10 or more years of service will receive no less than 50 percent of the benefit that the active fireman would have received had they attained age 50 and 20 years of service.

Death In Service (Duty Related)

Compensation Annuity[2]

The annuity paid to the spouse equals 75 percent of the firefighter's salary attached to his civil service position at the time of his death. This amount increases as the salary of the position increases. This benefit is payable until the year in which the firefighter would have reached the compulsory retirement age.

Death In Service (Duty Disability)

Compensation Annuity

The annuity paid to the spouse of a member who dies in receipt of duty disability benefits equals 75 percent of the firefighter's salary attached to his civil service position at the time of his death. This amount increases as the salary of the position increases.

Death after Retirement

(1) If the firefighter dies after retirement, the annuity is 50 percent of the retirement annuity that the deceased firefighter was receiving at the time of his or her death; or

(2) Money purchase based on the sums accumulated for the spouse annuity plus 10 percent of the accumulated City contributions for each year of service from 10 to 20 years, and full accumulated City contributions after 20 years of service.

[2] Between January 1994 and December 2000, benefits have been administered as if there were no compulsory retirement age. Beginning December 2000 benefits have been administered as if age 63 is the compulsory retirement age for non-EMT participants and there is no compulsory retirement age for EMT participants.

Maximum Annuity
No maximum dollar amount.

Minimum Annuity
The minimum monthly annuity for any widow/widower is the greater of $1,000 or 125% of the Federal Poverty Level.

For participants who first became members on or after January 1, 2011, widow benefits are equal to 66-2/3 percent of the firemen's earned annuity at the date of death. Automatic increases to the annuity are equal to the lesser of 3.00 percent and 50 percent of CPI-U, commencing when the survivor reaches age 60, and applied to the original granted retirement annuity.

Child Annuity

Upon the death of the firefighter, unmarried children less than age 18 (except where child is so physically or mentally handicapped as to be unable to support himself) are eligible to receive an annuity. The amount of annuity payable for a child is 10 percent of the current annual maximum salary of a first class firefighter while a widow/widower survives; 15 percent when no widow/widower survives.

Family Maximum

The total annuities for widow/widower and children cannot exceed 60 percent for non-duty death, or 100 percent for duty death, of the current maximum annual salary of a first class firefighter.

Parent Annuity

Parent's annuity is provided for each surviving parent of a firefighter who dies prior to separation from service, or while out of service with at least 20 years; provided there is no widow/widower or child and that the deceased firefighter was contributing to their support. The benefit is an amount equal to 18 percent of the current annual salary attached to the classified position held by the firefighter at the time of death.

Disabilities

Duty Disability Benefit[3]
Injury incurred in the performance of duty. The amount of the benefit is 75 percent of salary at the time the disability is allowed payable to employee's compulsory retirement age plus $30 per month for each unmarried child less than age 18 (except where the child is so physically or mentally handicapped as to be unable to support him/herself), but the total amount of child benefits shall not exceed 25 percent of salary. Effective January 1, 1994, the minimum benefit, if the employee has been on disability at least 10 years, is 50 percent of current salary at the rank held by the employee when he was removed from the

[3] Between January 1994 and December 2000, benefits have been administered as if there were no compulsory retirement age. Beginning December 2000 benefits have been administered as if age 63 is the compulsory retirement age for non-EMT participants and there is no compulsory retirement age for EMT participants.

Department payroll. Salary deductions are contributed by the City. There are no age or service requirements for retirement on money purchase annuity and receiving full contributions.

Occupational Disease Disability[4]

A firefighter who has 10 or more years of service and is unable to perform his or her duties by reason of heart disease, tuberculosis or any disease of the lungs or respiratory tract, resulting solely from his or her service as a firefighter. Occupational disease also includes disabling cancer of the type which may be caused by exposure to heat, radiation or a known carcinogen as defined by the International Agency for Research on Cancer. The amount of the benefit is 65 percent of salary at the time of the employee's removal from the Department payroll payable to compulsory retirement age plus $30 a month for each unmarried child less than age 18 (except where the child is so physically or mentally handicapped as to be unable to support him/ herself), but the total amount of child's benefits shall not exceed 25 percent of salary. Effective January 1, 1994, the minimum benefit, if the employee has been on disability at least 10 years, is 50 percent of current salary at the rank held by the employee when he or she was removed from Department payroll. Salary deductions are contributed by the City. There are no age or service requirements for retirement on money purchase annuity and receiving full contributions.

Ordinary Disability Benefit

Cause other than the performance of an act of duty, payable after 30 days for a period equal to 50 percent of total service (not including any previous O.D. time), but not to exceed five years. The disability benefit is 50 percent of salary at time of disability less pension deductions. When the disabled firefighter becomes eligible for the minimum formula annuity, the disability benefit shall cease, and he or she shall thereafter receive an annuity; however, there are no age or service requirements to retire on money purchase from disability prior to qualification for the minimum formula annuity if the disability then terminates.

Death Benefit

In active service, on an authorized leave of absence, if death occurs within 60 days of receipt of salary, receiving duty or ordinary disability benefit, occurring within 60 days of termination of such benefit, or occurring on retirement while in receipt of annuity and separation was effective after age 50 and application was made within 60 days from separation; payable to written beneficiaries or, if none, to estate.

[4] Between January 1994 and December 2000, benefits have been administered as if there were no compulsory retirement age. Beginning December 2000 benefits have been administered as if age 63 is the compulsory retirement age for non-EMT participants and there is no compulsory retirement age for EMT participants.

Summary of
Principal Eligibility and Benefit Provisions
As of December 31, 2018

Age	Death in Service After July 1, 1983	Death After Retirement After July 1, 1983
49 and under	$12,000	$6,000
50	11,600	6,000
51	11,200	6,000
52	10,800	6,000
53	10,400	6,000
54	10,000	6,000
55	9,600	6,000
56	9,200	6,000
57	8,800	6,000
58	8,400	6,000
59	8,000	6,000
60	7,600	6,000
61	7,200	6,000
62	6,800	6,000
63	6,400	6,000
64 and over	6,000	6,000

Refunds

To Firefighters

Of entire amount (excluding ordinary disability pension deductions) with interest at 4 percent if entered before June 30, 1953, and 3 percent otherwise, before age 50, or before age 57 and less than 10 years of service. A firefighter who receives a refund and who subsequently reenters the service shall not receive, nor his or her widow/widower or parents, any annuity benefit or pension unless the refund is repaid with 4 percent interest. Repayment must be made within two years after reentry.

For Widow/Widower Annuity

If the firefighter is not married when he retires on annuity, he or she will receive a refund of all his or her contributions, with interest, for spouse's annuity.

Refunds of Remaining Amounts

If amounts contributed by a firefighter (with interest) are not paid out to him or her, in the form of a refund or annuity, or his or her widow/widower in the form of annuity, the remaining amounts (with interest) shall be paid out to his or her heirs, or to administrator of estate, for burial expense. If there are children under age 18, amount necessary to pay children annuities will not be refunded. There will be no refund paid to a widow/widower whose annuity is suspended because of remarriage.

Summary of
Principal Eligibility and Benefit Provisions
As of December 31, 2018

Deductions and Contributions

	Deductions	City Contributions[1]
Employee	7.125%	8.500%
Spouse	1.500%	2.000%
Ordinary Disability	0.125%	0.000%
Annuity Increase	0.375%	0.000%
	9.125%	10.500%

[1] *Credited to participant's Accumulation Annuity and Widow's Annuity accounts*

Prior to 2015, the city shall levy a tax annually at a rate on the dollar of the assessed valuation of all taxable property that will produce an amount not to exceed the total amount of contributions by the firefighters to the Fund made in the calendar year two years prior multiplied by 2.26 for 1982 and each year thereafter, plus $142,000 for the Ordinary Death Benefit.

Under P.A. 99-0506, City contributions are equal to $199 million in payment year 2016, $208 million in payment year 2017, $227 million in payment year 2018, $235 million in payment year 2019 and $245 million in payment year 2020. For payment years after 2020, annual employer contributions combined with member contributions and other Fund revenue must equal the amount, as a level percentage of payroll, that is sufficient to produce 90 percent funding by the end of fiscal year 2055.

Death Benefit

Employees contribute $2.50 per month at the same time and with the same frequency as other deductions (with each payment of salary).

Tax Shelter of Employee Salary Deductions

Beginning January 1, 1982, employee contributions were designated for income tax purposes to be made by the employer. The W-2 salary is therefore reduced by the amount of contribution. For pension purposes the salary remains unchanged. Income tax will be paid when a refund or annuity is received. For the purpose of benefits, refunds or financing, these contributions will be treated as employee contributions.

Compulsory Retirement Age

Effective January 1, 1994, the federal law (ADEA) allowing compulsory retirement at age 63 lapsed. As such, duty disability and occupational disease disability benefits and widow/widower compensation benefits may be "open ended"; i.e., without limiting age.

Effective December 2000 the City of Chicago enacted a compulsory retirement age of 63 for non-EMT participants. As such, all disability benefits for non-EMT participants cease at age 63 and become payable as retiree benefits.

Compensation Widows

Beginning January 1, 2001, mandatory retirement will have no impact on Widow benefits. Therefore, effective with the December 31, 2001, valuation, all Supplemental Widows have been re-classified as Compensation Widows. The classification of Supplemental Widows has been discontinued.

Salary Cap and COLA Development for Members Hired on or after January 1, 2011

Year Ending	CPI-U	½ CPI-U	COLA	Maximum Annual Pensionable Earnings
2011			3.00%	$ 106,800.00
2012	3.90%	1.95%	1.95%	108,882.60
2013	2.00%	1.00%	1.00%	109,971.43
2014	1.20%	0.60%	0.60%	110,631.26
2015	1.70%	0.85%	0.85%	111,571.63
2016	0.00%	0.00%	0.00%	111,571.63
2017	1.50%	0.75%	0.75%	112,408.42
2018	2.20%	1.10%	1.10%	113,644.91
2019	2.30%	1.15%	1.15%	114,951.83

APPENDIX 6

LEGISLATIVE CHANGES 1968 THROUGH 2018

Legislative Changes 1968 through 2018

1968 to 1979 Sessions

- Compensation widow/widower annuities changed from $300 to 75 percent of salary;
- Supplemental widow/widower annuities became 40 percent of salary;
- Five-year average salary became four years;
- Minimum employee annuities increased from $200 in stages;
- Minimum widow/widower annuities increased from $100 in stages;
- Children's annuities changed from $40/$60 to 10%/15% of salary of first class firefighter;
- Parent annuities increased to 18 percent of salary of first class firefighter;
- Lump sum benefits were increases; and
- The deduction from salary increased from 1 percent to 1.5 percent of salary for the spouse annuity.

1979 Session

SB 854
Recall of elective members of the Board of Trustees.

HB 291
Authorizes investment in Time Deposits of Certificate of Deposit.

HB 2012
Employer may pick up, under IRS Code Section 414(h), the employee contributions for all compensation earned after December 31, 1980, by a reduction in the cash salary, an offset to a future salary increase or by a combination of both.

1980 Session

Transfer of credit to the General Assembly System.

HB 3635
Reversed all changes made by HB 2012 and put the pick up section as a new paragraph. They are treated as employee contributions for all purposes including refunds and determination of the tax levy.

1981 Session

SB 21
Actuarial Reporting Standards.

SB 851
Authorizes investments in conventional mortgage pass-through securities.

SB 879
Financial statement required by Department of Insurance within six months and actuarial statement within nine months. $100 penalty per day if late.

HB 291
Increase minimum survivor's annuity from $200 to $250.

Spring 1982 Session

SB 740
Three percent post-retirement increase for employees born before January 1, 1930. All increases begin at age 60 instead of age 63 effective July 1, 1982.

SB 1127
Group health hospital and surgical insurance premium $55 for annuitant not qualified to receive Medicare; $21 if annuitant is qualified, effective January 1, 1983.

SB 1579
Expanded fiduciary standards, prohibited transactions, civil action may be brought by Attorney General or by a participant. List of permitted investments moved to general section of the statute.

HB 2361
Election by mail ballot.

Spring 1983 Session

SB 22
Delegation of investment authority restrictions.

SB 1147
Minimum reporting and actuarial information for 1984.

HB 366, SB 288
Changes fiduciary standards: party in interest definition; reasonable care of co-fiduciary; eliminates civil action.

HB 377
Cancer as occupational disability.

HB 380
Paramedics as members July 1, 1983.

HB 455
Bill of Rights.

HB 483
Temporary position defined.

HB 514
10 percent prudent person investment category.

HB 755
Change in lump sum death benefit: $6,000 if retired, $12,000 if active and under age 50, reduced by $400 each year age 50 or older.

HB 758
Vote by mail.

50/20 2 percent minimum annuity formula (52/22 in 1984; 51/21 in 1985; 50/20 in 1986 and after).

30 percent salary of first class firefighter; widow/widower of active employee with 1.5 years of service effective June 30, 1984.

50 percent of retirement pension being paid (includes increases); widow/widower of retiree effective June 30, 1984.

City Ordinance

Change in lump sum death benefit: $6,000 if retired, $12,000 if active and under age 50, reduced by $400 each year age 50 or older.

Changes compulsory retirement from 63 to 70.

1984 Session

Direct deposit.

Illinois Public Employees' Pension Laws Commission abolished.

1985 Session

HB 164
Occupational disability benefits from 50 percent to 65 percent of salary for new disabilities.

Survivors' annuity for death in service 50 percent of the firefighter's annuity as if the deceased firefighter had retired just prior to the date of death.

Removes alcoholism and venereal disease prohibition against paying ordinary disability.

Removes adoption before age 50 requirement for child's benefit.

1986 Session

HB 2630
Removes the age 18 limitation for handicapped children of duty and occupational disease disability recipients.

Provides for waiver of annual physical examination for disability recipients if firefighter is permanently disabled and unable to ever return to service.

1987 Session

None.

1988 Session—City Ordinance

Compulsory retirement changed to age 63.

1989 Session

HB 332
\$325 minimum widow/widower annuity effective January 1, 1988.

SB 95
Changed the amount of fund paid health insurance “supplement” from January 1, 1988, until December 31, 1992, to \$65 per month for each annuitant not qualified to receive Medicare benefits (and \$35 if qualified) and from January 1, 1993, until December 31, 1997, the amounts are \$75 and \$45, respectively. Widow/widowers will now be eligible for supplement. The City will be required to pay 50 percent of the aggregate cost of health care claims for the retired group under all health care plans offered by the City. A procedure was established for the City to determine, with the help of an independent actuary, the aggregate cost of claims and premiums for each calendar year from 1989 through 1998 for the retired group.

\$475 minimum employee annuity effective January 1, 1990.

Compensation and Supplemental annuitants may remarry after 1989 without loss of benefits.

Employee refunds must be repaid at 4 percent before the later of two years after the date of reentry or January 1, 1992.

Three percent postretirement increase beginning January 1, 1990, for employees born after December 31, 1929, and before January 1, 1940.

Employee may purchase periods of suspension (not to exceed a total of one year of service) and 1980 strike time (not to exceed 23 days). Paramedic who transferred from the pension fund established under Article 8 of this Code to this Fund by operation of Public Act 83-780 may purchase Article 8 service at 4 percent annual compound interest rate prior to January 1, 1992, if the employee received a refund from the Article 8 fund.

1990 Session

SB 136

Amends Chapter 120, Paragraph 671 of the Revenue Act to provide for a separate listing on the tax bill of the dollar amount of tax due from the person assessed, which is allocable to a tax levied under the Illinois Pension Code, or any other tax levied by a municipality or township for public pension or retirement purposes. Effective January 1, 1990.

SB 1951

Signed January 14, 1991. Service credit will be given for any periods prior to January 14, 1993, that an active firefighter who is a member of the General Assembly is absent to perform his legislative duties. No payment is required for this service credit. The current salary of the rank would be used for average salary for annuity purposes.

Any firefighter who had service as a paramedic in the Municipal Fund and received a refund of contributions could receive credit for the service in the Fire Fund by making written application to the Board by January 1, 1992, and paying for the service.

Beginning December 31, 1990, any firefighter with at least 20 years of service may withdraw from the service at any age and receive an annuity calculated under Section 6-128 beginning at age 50 if under that age at withdrawal.

Beginning January 1, 1990, the minimum widow/widower annuity is $400 per month for all those receiving a widow/widower annuity on January 14, 1991 and for future widow/widowers of employees who retired at age 50 or over with at least 20 years of service.

If a widow/widower remarries after December 31, 1989, after attaining age 60, the annuity will continue without interruption. If the annuity is suspended because of remarriage before attaining age 60, annuity payments will be resumed if the subsequent marriage ends.

If any widow/widower receives a widow/widower annuity from the Fire Fund and after December 31, 1989, marries a firefighter in the Fund, his/her first widow/widower annuity will be canceled if she accepts any payment of a second widow/widower's annuity after he dies.

Beginning January 14, 1991, any city officer can transfer his Fire service to the Municipal Fund.

1991 Session

None.

1992 Session

HB 969
Approved March 26, 1992. Beginning January 1992, the minimum retirement annuity (requires retirement at age 50 or over with at least 20 years of service) was increased to $650 per month and the minimum widow/widower annuity was increased to $500 for those receiving annuity and those who will be eligible in the future (requires retirement or death in service at age 50 or over with at least 20 years of service).

SB 1650
Approved January 25, 1993.

The minimum retirement annuity (requires retirement at age 50 with at least 20 years of service) was increased to $750 per month on January 1, 1993, and $850 per month on January 1, 1994.

The minimum widow/widower annuity (requires retirement or death in service at age 50 or over with at least 20 years of service) was increased to $600 per month on January 1, 1993, and $700 per month on January 1, 1994, for those eligible present and future widow/widowers.

Service credit will be given for any periods in General Assembly prior to January 9, 1997 (instead of January 14, 1993).

The annuitant may waive all or any portion of his annuity.

1993 Session

SB 358
Approved January 10, 1994. Beginning January 1, 1994, minimum Duty and Occupational Disease Disabilities have been established, if the employee has been on the disability for 10 years: 50 percent of current salary of rank at removal from Department payroll.

ADEA
Effective January 1, 1994, the federal law (ADEA) allowing compulsory retirement at age 63 lapsed. As such, duty disability and occupational disease disability benefits and widow/widower compensation benefits may be “open ended”; i.e., without limiting age.

1994 Session

None.

1995 Session

SB 114
Approved July 14, 1995.

The minimum widow/widower annuity was increased to $700 per month for anyone entitled to receive a widow/widower annuity.

A widow/widower's annuity that was previously terminated because of remarriage before December 31, 1989, will be resumed upon proper application if the subsequent marriage has ended.

Employees have until two years after the date of reentry or January 1, 2000, to repay a refund.

For employee annuitants born before January 1, 1945, the 3 percent postretirement increase begins at age 55.

The provisions relating to purchase of credit for certain periods of service as a paramedic or other fire department employee were changed.

The City is authorized to substitute funds obtained from borrowings and other sources for a portion of its authorized tax levy for pension purposes.

The amount of earnings that may be taken into account by any retirement system is limited to the maximum dollar limitation specified in Section 401(a)(17) of the Internal Revenue Code, except for persons who became participants before 1996.

The Fund is authorized to make certain involuntary distributions required by Section 401(a)(9) of the Internal Revenue Code.

SB 424
Approved July 7, 1995.

The Pension Laws Commission was created as a legislative support services agency.

1996 Session

SBJPA
On August 20, 1996, the Small Business Job Protection Act was signed by President Clinton.

Treatment of governmental plans under Code Section 415:
Rule limiting annual benefit to 100 percent of the average of the highest three-year compensation no longer applies.

Excess benefit plans are permitted to provide participants with benefits in excess of the Code Section 415 limits.

Early retirement reduction does not apply to certain survivor and disability benefits.

The definition of compensation now includes elective deferrals.

Taxation of distributions:
$5,000 death benefit exclusion was repealed for deaths after August 20, 1996.

Five-year averaging for lump sum distributions was repealed effective January 1, 2000.

Annuity payments will be taxed according to a simplified general rule, which uses investment and age as of annuity starting date for annuities, which start on or after November 19, 1996.

1997 Session

HB 313
Signed June 27, 1997.

Coverage in the City group health insurance is extended through June 30, 2002, with some modification in plans offered. Pension fund supplement remains $45 and $75 for Medicare eligible and non-Medicare eligible annuitants respectively.

1998 Union Contract Cost of Living Increases

The following salary increases are scheduled:
1.5 percent effective July 1, 1995.

1.5 percent effective January 1, 1996.

1.5 percent effective July 1, 1996.

3.5 percent effective January 1, 1997.

3.75 percent effective January 1, 1998.

2.25 percent effective January 1, 1999.

1998 Session

The minimum widow/widower annuity (requires retirement or death in service at age fifty or over with at least twenty years of service) was increased to $800 per month on January 1, 1999, for those eligible present and future widow/widowers.

1999 Session

None.

2000 Session

In 2000 the City of Chicago enacted mandatory retirement for all firefighters, except for emergency medical technicians, upon attainment of age 63.

2001 Session

None.

2002 Session
HB 5168
Effective June 28, 2002.

The pension fund subsidy for retiree health insurance was extended through June 30, 2003 (other than child annuitants). The subsidy is $75 per month if the annuitant is not eligible for Medicare and $45 per month if the annuitant is eligible for Medicare.

2003 Session
SB 1701
Effective July 1, 2003.

The healthcare benefits were increased to $85 per month for non-Medicare eligible participants and $55 per month for Medicare eligible participants for the period from July 1, 2003 through June 30, 2008. Thereafter, the benefits are increased from $85 to $95 and $55 to $65 for the period July 1, 2008, to June 30, 2013.

The healthcare benefits referred to above are not and shall not be construed to be pension or retirement benefits for the purposes of Section 5 of Article XIII of the Illinois Constitution of 1970.

2004 Session
PA 93-0654
Effective January 16, 2004.

Changes to the definition of salary used for benefit calculation.

- For members born before 1955, who hold an exempt position above career service rank, salary means the actual salary attached to the exempt rank position.
- Salary as an ambulance commander shall be included. Employee contributions must be made retroactively before January 1, 2006. Beneficiaries may also make the contributions.
- Additional compensation for being licensed as an EMT shall be included.
- Duty availability pay shall be included. Employee contributions must be made retroactively before January 1, 2006. Beneficiaries may also make the contributions.

PA 93-0654 (continued)

An employee who reaches the compulsory retirement age with greater than 10 years of service, but less than 20 is now entitled to an annuity of 30 percent of average salary for the first 10 years of service plus an additional two percent for each year in excess of 10, not to exceed 50 percent.

The minimum annuity formula accrual rate for service after 20 years was increased from 2.0 percent to 2.5 percent with total benefits limited to 75 percent of final average pay.

The minimum benefit for retirements at age 50 with 20 years of service was increased to $950 per month during 2004 and $1,050 per month thereafter.

The minimum widow annuity was increased to $900 per month during 2004 and $1,000 per month thereafter.

The widow of an active fireman with 10 or more years of service will receive no less than 50 percent of the benefit the active firemen would have received had he attained age 50 and 20 years of service.

A widow who was married to a deceased fireman before the fireman began to receive a retirement annuity and for at least one year preceding the fireman's death is entitled to a widow's benefit. Any refunded contributions must be repaid with four percent interest.

A widow's benefit will continue following remarriage. Those annuities previously terminated will resume.

Members born prior to January 1, 1955, are entitled to a three percent simple COLA commencing at the later of age 55 or the first anniversary of retirement. Members born on or after January 1, 1955, are entitled to a 1.5 percent COLA commencing at the later of age 60 or the first anniversary of retirement limited to 30 percent. Previously the cutoff date was January 1, 1945.

Former city contributions for paramedics will be transferred to this fund with 11 percent interest and credited to the individual fireman if he or she pays for prior service as a paramedic in full.

Bertucci court opinion
Effective June 29, 2004.

For members who die while receiving duty disability payments, the widow's benefit is now 75 percent of the member's salary attached to his civil service position. The benefit increases as the salary attached to this position increases. Previously the widow's benefit was 50 percent of the member's benefit.

PA 93-0917 (HB 378)
Effective August 12, 2004

Changes the widow eligibility conditions by expanding widow benefits that were previously limited by marriage conditions after withdrawal or disability. Benefits cannot be reinstated or granted earlier than January 16, 2004.

PA 93-0917(continued)

A fireman who accumulated service under the Municipal Employees' Annuity and Benefit Fund of Chicago, who terminated and received a refund, may purchase such service credit until January 1, 2005. Those firemen who retired after January 16, 2004, but before the effective date of this act may still purchase service before January 1, 2005, and have their benefit recalculated. Employer contributions with interest, for such service, will be transferred from the Municipal Employees' Annuity and Benefit Fund to the Firemen's Annuity and Benefit Fund.

2005 Session
SB 23
Approved June 27, 2005.

Prohibits the investment or deposit from the retirement system or pension fund to certain entities doing business in or with the government of the Republic of the Sudan. Fund managing companies must certify that, as required under Section 1-110.5 of the pension code, they have not loaned to, invested in or otherwise transferred any of the pension fund assets to a forbidden entity.

2006 Session

None.

2007 Session

PA 95-0279

Beginning January 1, 2008, removes restriction that a child be born or legally adopted before withdrawal from service for a child's annuity. Removes restriction requiring that adoption proceedings must have been initiated one year prior to the fireman's death.

2008 Session

None.

2009 Session

PA 95-1036
Effective February 17, 2009.

Allows a terminally ill fireman to apply for disability while still an active member.

PA 96-0006
Effective April 3, 2009.

The Illinois Governmental Ethics Act.

PA 96-260
Effective August 11, 2009.

A fireman may purchase up to 24 months of service credit attributed to service in the armed forces of the United States prior to employment as a firefighter by making contributions to the Fund equal to (i) employee contributions during the period served, (ii) employer normal costs during the period served, and (iii) compound interest at the actuarially assumed rate from date of membership in the Fund until date of payment.

PA 96-727
Effective August 25, 2009.

Extends the repayment of refund for reinstated service to January 1, 2011, with interest calculated at the actuarially assumed rate.

Allows a fireman to transfer eligible service with the Article 8 Fund – the Municipal Employees' Annuity and Benefit Fund of Chicago. The fireman is required to pay to the Fund an amount equal to (i) employee contributions during the period served, (ii) employer normal costs during the period served, and (iii) compound interest at the actuarially assumed rate from date of membership in the Fund until date of payment. This amount is offset by contributions transferred from the Article 8 Fund. Written application must be made by January 1, 2010.

Allows a fireman who was an employee of the Chicago Fire Department but did not participate in the pension fund to establish this service with the Fund. The fireman is required to pay to the Fund an amount equal to (i) employee contributions during the period served, (ii) employer normal costs during the period served, and (iii) compound interest at the actuarially assumed rate from date of membership in the Fund until date of payment. Written application must be made by January 1, 2010.

Allows a fireman to transfer up to 10 years of eligible service with an Article 4 Fund – “Downstate Fund.” The fireman is required to pay to the Fund an amount such that the transfer results in no additional unfunded actuarial accrued liability for the Fund based on the assumptions and methods used in the most recent actuarial valuation. Contributions transferred from the Downstate Fund are used to offset the required payment from the fireman.

Allows the Fund to recover damages from a third party responsible for the death or disability payable from the Fund.

PA 96-753
Effective August 25, 2009.

Encourages the public pension funds, and any State entity investing on behalf of the public pension funds, to promote the economy of Illinois through the use of economic opportunity investments.

Instructs the fund's investment advisors to utilize investment strategies designed to ensure that all securities transactions are executed in such a manner that the total explicit and implicit costs and total proceeds in every transaction are the most favorable under the circumstances.

2010 Session

PA 96-1466
Effective August 20, 2010.

Members entering the Fund after on or after January 1, 2011, shall not be given service credit in this Fund for any period of time in which the member was in receipt of retirement benefits from any annuity and benefit funds in operation in the city.

PA 96-1495 (HB 3538)
Effective January 1, 2011.

Changes the financing for the Fund. Assets are marked to market at March 30, 2011. For fiscal years after March 30, 2011, actuarial value of assets is used based on five-year smoothing. The City levies a new tax starting in FY2015. Each year, employer contributions combined with member contributions and other fund revenue must be equal to the amount that is sufficient to produce 90% funding by the end of fiscal year 2040. The projections are based on an open group projection and level percent of pay financing and actuarial liabilities are based on the projected unit credit cost method. If the City does not make the statutorily required contributions, then the State, starting in FY 2016, could withhold State grants to the City, and directly deposit the withheld funds into the FABF. The withheld funds are limited to 33 percent of total State grants to the City in FY 2016, 67 percent in FY 2017, and 100 percent on and after FY 2018.

Changes benefits for members hired on or after January 1, 2011. For these employees the minimum retirement eligibility is at age 55 with 10 years of service with the annuity based on an accrual rate of 2.5 percent, subject to a maximum of 75 percent. Employees may retire at age 50 with 10 years of service with the annuity based on accrual rate of 2.5 percent, reduced by one half of one percent per month for retirement prior to age 55, subject to a maximum of 75 percent. The final average salary is based on 96 consecutive months within the last 120 months. Annual salary is capped at $106,800, indexed annually at the lesser of 3.0 percent and fifty percent of CPI-U. COLA is equal to the lesser of 3.0 percent and 50 percent of CPI-U, commencing at age 60, with no 30% cap, applied to the original granted retirement annuity. Widow benefits are 66-2/3 percent of the firemen's earned annuity at the date of death. Widow COLA is equal to the lesser of 3.0 percent and 50 percent of CPI-U, commencing when the survivor reached age 60, and applied to the original granted retirement annuity.

2011 Session

P.A. 97-530 (SB 1672)
Effective August 23, 2011.

Requires all pension funds and retirement systems subject to the Code to comply with the federal Heroes Earnings Assistance and Relief Tax Act of 2008.

P.A. 97-609 (SB 1831)
Effective August 26, 2011.

Applies to those members hired on or after January 1, 2012.

Provides that if a new hire is receiving a retirement annuity or pension and accepts a contractual position to provide services to a governmental entity from which he or she has retired, then that person's annuity or pension will be suspended during that contractual service.

Makes it a Class A misdemeanor for a pensioner who is seeking contractual employment to fail to notify certain persons about his or her retirement status before accepting an employment contract.

P.A. 97-504 (HB 1670)
Approved August 23, 2011.

Amends the Open Meetings Act.

Requires each elected or appointed member of a public body subject to this Act who is such a member on the effective date of the amendatory Act to successfully complete the electronic training curriculum developed and administered by the Public Access Counselor.

Requires those members to complete the training not later than one year after the effective date of the amendatory Act.

Requires each elected or appointed member of a public body subject to the Act who becomes such a member after the effective date of the amendatory Act to successfully complete the electronic training curriculum developed and administered by the Public Access Counselor.

Requires those members to complete the training not later than the 90th day after the date the member either (i) takes the oath of office, if the member is required to take an oath of office to assume the person's duties as a member of the public body or (ii) otherwise assumes responsibilities as a member of the public body, if the member is not required to take an oath of office to assume the person's duties as a member of the governmental body.

Requires each member who successfully completes the curriculum to file a copy of the certificate of completion with the public body.

Provides that the failure of one or more members of a public body to complete the training required by this Section does not affect the validity of an action taken by the public body.

Provides that an elected or appointed member of a public body subject to this Act who has successfully completed the required training and filed a copy of the certificate of completion with the public body is not required to subsequently complete that training.

2012 Session

P.A. 97-0651
Approved and effective January 5, 2012.

Requires any reasonable suspicion of fraud against the Fund to be reported to the State's Attorney for investigation.

Changes provisions for Union Leaves of Absence.

2013 Session

P.A. 98-0043 (SB 1584)
Approved and effective June 28, 2013.

Changes the duration of health insurance supplement payments to eligible employee annuitants to "Beginning July 1, 2008 and until such time as the city no longer provides a health care plan for such annuitants or December 31, 2016, whichever comes first."

P.A. 98-0443 (HB 2620)
Approved and effective August 16, 2013.

Allows for an additional exception to the RFP process for obtaining investment services for "contracts for follow-on funds with the same sponsor through close-end funds."

2014 Session

No legislative changes.

2015 Session

No legislative changes.

2016 Session

P.A. *99-0506*

Approved and effective May 30, 2016.

Changes the funding policy. For payment years 2016 through 2020, specifies the amount for the City of Chicago's required annual contribution to the Fund. Beginning in payment year 2021, the City's total required contribution to the Fund shall be an amount that is equal to the normal cost of the fund, plus an amount sufficient to bring the total assets of the fund up to 90% of the total actuarial liabilities of the fund by payment year 2055 (instead of 2040).

Changes the actuarial cost method to entry age normal.

Includes provisions for funding from any proceeds received by the city in relation to the operation of a casino within the city.

Provides a mechanism to enforce funding through mandamus.

Creates a new minimum retirement annuity provision equal to 125% of the federal poverty level for certain persons.

P.A. *99-0905*

Approved and effective November 29, 2016.

Specifies the manner of calculating the Tier 2 surviving spouse's annuity for Tier 2 policemen who die in service with at least 1 1/2 years of service

Specifies the manner of computing duty-death benefits for Tier 2 surviving spouses and provides that Tier 2 duty-death benefits are not payable where the death is the result of an intervening cause.

Includes provisions for a minimum surviving spouse's annuity equal to 125% of the federal poverty level.

Increases the Tier 1 automatic annual increase in retirement annuity for persons born after December 31, 1954 but before January 1, 1966.

Amends the State Mandates Act to require implementation without reimbursement.

2017 Session

P.A. 100-0334
Approved and effective August 25, 2017

Provides for the forfeiture of benefits for any person who otherwise would receive a survivor benefit who is convicted of any felony relating to or arising out of or in connection with the service of the member from whom the benefit results.

P.A. 100-0539
Approved and effective November 7, 2017

For firemen born after December 31, 1954, but before January 1, 1966, changed the initial increase granted and provides for a 3% increase if a 1.5% increase was previously granted.

P.A. 100-00544
Approved and effective November 8, 2017

At any time during the six months following the effective date of the Public Act, an active member may apply for transfer of up to ten years of his or her creditable service accumulated in an Article 4 (downstate) pension fund.

2018 Session

P.A. 100-1144
Approved and effective November 28, 2018

Authorizes a person to participate in the Chicago Firefighter Article if he or she (1) is or was employed and receiving a salary as a fireman, (2) has at least 5 years of service under the Chicago Firefighter Article, (3) is employed in a position covered under a specified provision of the Chicago Municipal Article relating to aldermen and members of the city council, (4) made an election under the Chicago Municipal Article to not receive service credit or be a participant under that Article, and (5) made an election to participate under the Chicago Firefighter Article. Defines salary for such a person as the lesser of (i) the salary associated with the highest career service rank under the Chicago Firefighter Article or (ii) the actual salary received by that person for service under a specified provision of the Chicago Municipal Article relating to aldermen and members of the city council.

P.A. 100-1148
Approved and effective December 10, 2018

Technical correction related to filing copies of the report as required by Section 3.1 of the General Assembly Organizational Act and with the State Government Report Distribution Center for the General Assembly.