



CITY OF SPRINGFIELD POLICE OFFICERS' AND FIRE FIGHTERS' RETIREMENT SYSTEM

ACTUARIAL VALUATION

Plan Year: July 1, 2019 to June 30, 2020

Prepared by

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Contents

| | <u>Page</u> |
|---|-------------|
| Introduction and Purpose | 1 |
| Actuarial Certification | 2 |
| Discussion of Valuation Results | 4 |
| Summary of Valuation Results | 8 |
| Statement of Assets as of June 30, 2019 | 9 |
| Statement of Income and Disbursements | 10 |
| Development of Actuarial Value of Assets | 11 |
| Market Values of Assets for 0.3% Multiplier | 12 |
| Actuarial Value of Assets and UAL for 0.3% Multiplier | 13 |
| Actuarial Balance Sheet | 14 |
| Development of Policy Contribution | 15 |
| Actuarial Methods | 16 |
| Actuarial Assumptions | 17 |
| Summary of Plan Provisions | 20 |
| Summary of Participant Data | 23 |
| Actuarial Standard of Practice No. 51 | 30 |

**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Introduction and Purpose

In this report, we present the results of the June 30, 2019 actuarial valuation for the City of Springfield Police Officers' and Fire Fighters' Retirement System. The report has been prepared at the request of the System's Board for the sole use of the Board and the City of Springfield as the contributing plan sponsor.

PURPOSES OF THE VALUATION

The actuarial valuation of the Plan is intended to accomplish several purposes:

- Determine the policy contribution rates for the City's July 1, 2020 – June 30, 2021 fiscal year;
- Prepare information required under applicable governmental accounting standards (results are provided in a separate report);
- Assess the relative funded position of the plan on an ongoing basis, i.e., through a comparison of plan assets and projected plan liabilities.

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Actuarial Certification

As requested, we performed an actuarial valuation of the City of Springfield Police Officers' and Fire Fighters' Retirement System as of June 30, 2019 for the fiscal year ending June 30, 2021. Our findings are set forth in this actuary's report. This report reflects the benefit provisions and contribution rates in effect as of June 30, 2019.

In preparing this report, we relied, without audit, on information (some oral and some in writing) supplied by the City. This information includes, but is not limited to, statutory provisions, employee data, and financial information. We found this information to be reasonably consistent and comparable with information used for other purposes. The valuation results depend on the integrity of this information. If any of this information is inaccurate or incomplete our results may be different and our calculations may need to be revised.

All costs, liabilities, rates of interest, and other factors for the System have been determined on the basis of actuarial assumptions and methods which are individually reasonable (taking into account the experience of the System and reasonable expectations); and which, in combination, offer our best estimate of anticipated experience affecting the System.

This valuation report is only an estimate of the System's financial condition as of a single date. It can neither predict the System's future condition nor guarantee future financial soundness. Actuarial valuations do not affect the ultimate cost of System benefits, only the timing of System contributions. While the valuation is based on an array of individually reasonable assumptions, other assumption sets may also be reasonable and valuation results based on those assumptions would be different. No one set of assumptions is uniquely correct. Determining results using alternative assumptions is outside the scope of our engagement.

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. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future measurements. The City has the final decision regarding the appropriateness of the assumptions and adopted them as indicated in this report.

Actuarial computations presented in this report are for purposes of determining the policy contribution amounts for the System. The calculations in the enclosed report have been made on

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a basis consistent with our understanding of the System's funding requirements and goals. Determinations for purposes other than meeting these requirements may be significantly different from the results contained in this report. Accordingly, additional determinations may be needed for other purposes.

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- (a) The City may provide a copy of Milliman's work, in its entirety, to the System's professional service advisors who are subject to a duty of confidentiality and who agree to not use Milliman's work for any purpose other than to benefit the System.
- (b) The City may provide a copy of Milliman's work, in its entirety, to other governmental entities, as required by law.

No third party recipient of Milliman's work product should rely upon Milliman's work product. Such recipients should engage qualified professionals for advice appropriate to their own specific needs.

The consultants who worked on this assignment are retirement actuaries. Milliman's advice is not intended to be a substitute for qualified legal or accounting counsel.

The signing actuaries are independent of the plan sponsor. We are not aware of any relationship that would impair the objectivity of our work.

On the basis of the foregoing, we hereby certify that, to the best of our knowledge and belief, this report is complete and accurate and has been prepared in accordance with generally recognized and accepted actuarial principles and practices. We are members of the American Academy of Actuaries and meet the Qualification Standards to render the actuarial opinion contained herein.

We respectfully submit the following report, and we look forward to discussing it with you.

Sincerely,



Michael J. Zwiener, FSA
Consulting Actuary



Michael A. Sudduth, FSA
Consulting Actuary

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System
June 30, 2019 Actuarial Valuation**

Discussion of Valuation Results

1. Policy Contribution and Plan Experience

The results of this valuation are used to determine the policy contribution rates to the System for the July 1, 2020 - June 30, 2021 fiscal year. A comparison of policy contribution rates (presented as a percentage of pay) for the current and immediately preceding valuations is shown below:

| | <u>Actuarial Valuation as of</u> | |
|-----------------------------------|----------------------------------|----------------------|
| | <u>June 30, 2018</u> | <u>June 30, 2019</u> |
| Applies to Fiscal Year | 07/01/19 - 06/30/20 | 07/01/20 - 06/30/21 |
| Total Contribution Rate | 84.36% | 130.49% |
| Member Contribution Rate – Police | 17.70% * | 20.00% * |
| City Contribution Rate – Police | 66.66% | 110.49% |
| Member Contribution Rate – Fire | 15.13% ** | 15.13% ** |
| City Contribution Rate – Fire | 69.23% | 115.36% |

* The Police Member's contribution rate is the sum of a flat 8.50% rate plus an Additional Funding Contribution (AFC). It increased from 9.20% to 11.50% of pay effective July 1, 2019. There are no scheduled future adjustments.

** The Fire Member's contribution rate is the sum of a flat 8.50% rate plus an AFC. The Fire AFC increased from 6.13% to 6.63% effective July 1, 2016. This rate will remain level until the earlier of July 1, 2029 or the date the Fire AFC UAL reaches zero, at which time it will cease.

The System experienced a net actuarial gain for the year ending June 30, 2019. A detailed reconciliation of the gain is shown below.

| | |
|--|-----------------|
| Unfunded Accrued Liability (UAL) as of June 30, 2018 | \$70,739,363 |
| Normal Cost as of June 30, 2018 | 5,197,544 |
| Employer and Employee Contributions | (9,212,001) |
| Interest | 4,993,163 |
| Change in UAL due to Assumption Changes | 60,951,257 |
| Change in UAL due to Plan Change | <u>(71,511)</u> |
| Expected UAL as of June 30, 2019 | \$132,597,815 |
| Actual UAL as of June 30, 2019 | 116,087,776 |
| (Gain)/Loss: Actual UAL – Expected UAL | (16,510,039) |

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Sources of (Gain)/Loss:

| | |
|---|----------------|
| Investment Return on Smoothed Assets | \$8,483,203 |
| Other Contributions | (34,916,101) |
| Salary Scale/Active Data | 3,179,040 |
| Average Salary at Retirement | 50,752 |
| Retirement | 2,054,247 |
| Withdrawal | 1,191,726 |
| Disability | (359,457) |
| Death | 4,760 |
| Inactive Mortality | 3,361,977 |
| Terminated Vested Retirements | 163,806 |
| Data Corrections | 219,589 |
| Difference between Actual and Expected Benefit Payments | 56,416 |
| Other | <u>3</u> |
| Total | (\$16,510,039) |

2. Plan Assets

The market value of assets increased from \$428,665,084 at June 30, 2018 to \$459,788,276 at June 30, 2019. A balance sheet and statement of income and disbursements are presented on pages 9 and 10, respectively. The net market rate of return was 4.0% for the period.

City contributions to the System for the year were \$6,337,971, employee contributions totaled \$2,874,030 and the sales tax revenue (including receivables) was \$33,691,589. Benefit payments total \$26,313,731 plus \$2,860,175 in refunded employee contributions.

The actuarial value of assets increased from \$435,525,104 at June 30, 2018 to \$471,784,187 at June 30, 2019. The net actuarial rate of return for the period was 5.1% vs. the assumed rate of 7.0%.

3. Actuarial Assumptions, Methods and Plan Provisions

Several assumption changes were adopted as recommended in our December 2018 experience study covering experience during the period July 1, 2014 through June 30, 2018:

- The discount rate was changed from 7.00% to 6.50%.
- The mortality assumption was updated to the Pub-2010 Safety Amount-Weighted Mortality Tables with generational projection from 2010 using 70% of Scale MP-2018.
- Disability incidence rates were reduced by 50% at all ages.
- Turnover rates were reduced by 50% at all ages.
- The retirement rates were increased from 25% to 35% at ages 45 through 50 and increased from 20% to 25% at ages 51 through 53.

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In addition, effective July 1, 2019, Police Members leaving the service of the City for a service or disability retirement with pension will receive 17.40% of their annual contributions made at the 20.00% contribution rate after July 1, 2019.

All other actuarial assumptions, methods and plan provisions remained the same as the prior year. Descriptions of these can be found on pages 16-22.

4. Plan Population

The number of active participants decreased from 235 in the previous valuation to 215 in the current valuation. The number of retirees and beneficiaries increased from 575 to 591. The number of deferred vested participants increased from 18 to 19.

5. GASB 67/68

Results under GASB 67 and 68 will be presented in a separate report.

6. Missouri Pension Reform Legislation

In 2007, and later modified in 2013, the Missouri legislature passed legislation aimed at the state's public sector pension plans. The legislation was based on private pension reform instituted at the federal level. Many of the provisions are applicable to the Springfield Police Officers' and Fire Fighters' Retirement System, including:

- Plans less than 60% funded are required to have an accelerated contribution schedule prepared by their actuary. Because the System's ratio is now over 60%, we have not prepared the schedule this year.
- Plans less than 60% funded that have contributed less than 100% of the required contribution for 5 consecutive years and have a declining funded ratio shall have state funds withheld.
- Plans less than 80% funded are prohibited from providing benefit enhancements, and plans over 80% funded may only provide benefit increases that allow the funded ratio to remain over 75%.
- Benefit increases must be amortized over 20 years.
- Increased fiduciary responsibility and education requirements.

7. Additional Comments

Retirement plans use several mechanisms to attempt to provide more stability in contribution levels, one of which is an asset smoothing method. This System utilizes a method that compares the expected return on assets with the return actually experienced. One quarter of the difference between expected and actual return (positive or negative) is recognized in the current year and each of the next three years. Due to the smoothing method, the rate of return on the actuarial value of assets for the year ending June 30, 2019 was 5.1% as compared to 4.0% on a pure market value basis.

Use of an asset smoothing method is a common practice for public sector retirement plans. However, it is important to identify the potential impact of the deferred investment

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experience. Key June 30, 2019 actuarial valuation results are shown below using both the actuarial value of assets and pure market value:

| | <u>June 30, 2019 Results</u> | |
|-----------------------------------|--|---|
| | <u>Using Actuarial Value of Assets</u> | <u>Using Market Value of Assets</u> |
| Actuarial Liability | \$587,871,963 | \$587,871,963 |
| Asset Value | 471,784,187 | 459,788,276 |
| Unfunded Actuarial Liability | \$116,087,776 | \$123,083,687 |
| | | |
| Funded Ratio | 80.3% | 78.2% |
| | | |
| Total Contribution Rate | 130.49% | 139.90% |
| | | |
| Member Contribution Rate – Police | 20.00% | 20.00% |
| City Contribution Rate – Police | 110.49% | 119.90% |
| | | |
| Member Contribution Rate – Fire | 15.13% | 15.13% |
| City Contribution Rate – Fire | 115.36% | 124.77% |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Summary of Valuation Results

| | <u>Valuation Date</u> <u>June 30, 2016</u> | <u>Valuation Date</u> <u>June 30, 2017</u> | <u>Valuation Date</u> <u>June 30, 2018</u> | <u>Valuation Date</u> <u>June 30, 2019</u> |
|---|---|---|---|---|
| Participant Counts | | | | |
| <u>Police</u> | | | | |
| Actives | 157 | 148 | 136 | 128 |
| Receiving Payments | 266 | 272 | 280 | 287 |
| Terminated Vesteds | <u>15</u> | <u>15</u> | <u>17</u> | <u>18</u> |
| Total | 438 | 435 | 433 | 433 |
| <u>Fire</u> | | | | |
| Actives | 120 | 108 | 99 | 87 |
| Receiving Payments | 281 | 287 | 295 | 304 |
| Terminated Vesteds | <u>2</u> | <u>2</u> | <u>1</u> | <u>1</u> |
| Total | 403 | 397 | 395 | 392 |
| Market Value of Assets | 343,287,402 | 394,707,007 | 428,665,084 | 459,788,276 |
| Actuarial Value of Assets | 367,311,417 | 403,438,824 | 435,525,104 | 471,784,187 |
| Present Value of Future Benefits | 518,335,047 | 525,573,540 | 537,184,500 | 622,702,857 |
| Entry Age Normal Accrued Liability | 479,883,569 | 491,501,728 | 506,264,467 | 587,871,963 |
| Unfunded Entry Age Normal Accrued Liability | 112,572,152 | 88,062,904 | 70,739,363 | 116,087,776 |
| Policy Contribution (Employer and Employee) | 18,657,544 | 15,866,914 | 13,994,359 | 20,996,503 |
| Covered Payroll | 19,031,138 | 17,337,474 | 16,588,735 | 16,089,920 |
| Funded Ratio | 76.5% | 82.1% | 86.0% | 80.3% |
| Policy Contribution as a Percentage of Covered Payroll - Police | | | | |
| Member Portion | 17.70% | 17.70% | 17.70% | 20.00% |
| City Portion | <u>80.34%</u> | <u>73.82%</u> | <u>66.66%</u> | <u>110.49%</u> |
| Total | 98.04% | 91.52% | 84.36% | 130.49% |
| Policy Contribution as a Percentage of Covered Payroll - Fire | | | | |
| Member Portion | 15.13% | 15.13% | 15.13% | 15.13% |
| City Portion | <u>82.91%</u> | <u>76.39%</u> | <u>69.23%</u> | <u>115.36%</u> |
| Total | 98.04% | 91.52% | 84.36% | 130.49% |
| Present Value of Accrued Benefits | 450,924,195 | 468,908,740 | 486,457,060 | 566,780,096 |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Statement of Assets as of June 30, 2019

| <u>Assets</u> | <u>Market Value</u> |
|-------------------------------------|------------------------|
| 1. Cash and Short Term Investments | \$6,482,186 |
| 2. Investments at Fair Market Value | 447,344,991 |
| 3. Accrued Interest Receivable | 704,544 |
| 4. Due from Other Funds | 5,472,527 |
| Total Assets | 460,004,248 |
| | |
| <u>Liabilities</u> | |
| 1. Accounts Payable | 208,363 |
| 2. Due to Other Funds | 7,609 |
| Total Liabilities | 215,972 |
| Net Assets | <u>459,788,276</u> |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Statement of Income and Disbursements

| | |
|--|-------------------|
| 1. Market Value of Assets as of July 1, 2018 | \$428,665,084 |
| 2. Income: | |
| a. Employer Contributions | 6,016,409 |
| b. Employer Contributions for Fire AFC | 321,562 |
| c. Employee Contributions | 2,874,030 |
| d. Public Safety Sales Tax | 33,691,589 |
| e. Sale of Land | 0 |
| f. Donations | 0 |
| g. Other Revenue | 43,774 |
| h. Interest and Dividends | 92,139 |
| i. Net Appreciation/(Depreciation) in Fair Value | <u>19,612,273</u> |
| j. Total Income | 62,651,776 |
| 3. Expenses: | |
| a. Employee Benefit Distributions | 26,313,731 |
| b. Refund of Employee Contributions | 2,860,175 |
| c. Administrative Expenses | 407,504 |
| d. Investment Expenses | <u>1,947,174</u> |
| e. Total Expenses | 31,528,584 |
| 4. Net Increase (Decrease) = (2j) - (3e) | 31,123,192 |
| 5. Market Value of Assets as of June 30, 2019 = (1) + (4) | \$459,788,276 |
| 6. Net Rate of Return | 4.0% |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Development of Actuarial Value of Assets

| | Valuation Date <u>June 30, 2019</u> |
|---|--|
| 1. Actuarial Value Beginning of Year | \$435,525,104 |
| 2. Market Value End of Year | 459,788,276 |
| 3. Market Value Beginning of Year | 428,665,084 |
| 4. Non-Investment Cash Flows ⁽¹⁾ | 13,773,458 |
| 5. Investment Income | |
| a. Market Total: (2) - (3) - (4) | 17,349,734 |
| b. Assumed Rate of Return | 7.00% |
| c. Amount for Immediate Recognition ⁽²⁾ | 30,488,627 |
| d. Amount for Phased-In Recognition: (5a) - (5c) | (13,138,893) |
| 6. Phased-In Recognition of Investment Income | |
| a. Current Year: .25 x (5d) | (3,284,723) |
| b. First Prior Year | (2,397,268) |
| c. Second Prior Year | 2,652,800 |
| d. Third Prior Year | <u>(4,973,811)</u> |
| e. Phased-In Investment Gain Recognized | (8,003,002) |
| 7. Actuarial Value End of Year: (1) + (4) + (5c) + (6e) | 471,784,187 |
| 8. Excess of Market Value over Actuarial Value: (2) - (7) | (11,995,911) |
| 9. Approximate Rate of Return on Actuarial Value | 5.1% |

⁽¹⁾ Contributions minus benefit payments

⁽²⁾ Assumed Rate times (3) + Assumed Rate/2 times (4)

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City of Springfield
Police Officers and Fire Fighters' Retirement Fund
June 30, 2019 Actuarial Valuation

Development of Market Value of Assets for 0.3% Multiplier

| | <u>Police</u> | <u>Fire</u> | <u>Total</u> |
|---|------------------|------------------|------------------|
| 1. Market Value of Assets as of July 1, 2018 | \$10,347,289 | \$6,284,541 | \$16,631,830 |
| 2. a. Employer Contributions | 0 | 321,562 | 321,562 |
| b. Employee Contributions | 962,336 | 448,097 | 1,410,433 |
| c. Net Investment Income | <u>467,373</u> | <u>278,769</u> | <u>746,142</u> |
| d. Total Income | 1,429,709 | 1,048,428 | 2,478,137 |
| 3. a. Benefit Distributions and Refunds of Employee Contributions | <u>1,067,816</u> | <u>1,058,161</u> | <u>2,125,977</u> |
| b. Total Expenses | 1,067,816 | 1,058,161 | 2,125,977 |
| 4. Net Increase (Decrease): (2d) - (3b) | 361,893 | (9,733) | 352,160 |
| 5. Market Value of Assets as of June 30, 2019: (1) + (4) | \$10,709,182 | \$6,274,808 | \$16,983,990 |

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**City of Springfield
Police Officers and Fire Fighters' Retirement Fund**

June 30, 2019 Actuarial Valuation

Development of Actuarial Assets and Unfunded Accrued Liability for 0.3% Multiplier

| | <u>Police</u> | <u>Fire</u> | <u>Total</u> |
|--|------------------|-----------------|------------------|
| 1. Actuarial Value Beginning of Year | \$10,441,066 | \$6,342,558 | \$16,783,624 |
| 2. Market Value End of Year | 10,709,182 | 6,274,808 | 16,983,990 |
| 3. Market Value Beginning of Year | 10,347,289 | 6,284,541 | 16,631,830 |
| 4. Non-Investment Cash Flows (Contributions minus Benefit Payments) | (105,480) | (288,502) | (393,982) |
| 5. Investment Income | | | |
| a. Market Total: (2) - (3) - (4) | 467,373 | 278,769 | 746,142 |
| b. Assumed Rate of Return | 7.00% | 7.00% | 7.00% |
| c. Amount for Immediate Recognition: (3) x (5b) + (4) x (5b) / 2 | 720,619 | 429,820 | 1,150,439 |
| d. Amount for Phased-In Recognition: (5a) - (5c) | (253,246) | (151,051) | (404,297) |
| 6. Phased-In Recognition of Investment Income | | | |
| a. Current Year: .25 x (5d) | (63,311) | (37,763) | (101,074) |
| b. First Prior Year | (44,740) | (27,036) | (71,776) |
| c. Second Prior Year | 80,967 | 48,832 | 129,799 |
| d. Third Prior Year | <u>(121,489)</u> | <u>(74,572)</u> | <u>(196,061)</u> |
| e. Phased-In Investment Gain Recognized | (148,573) | (90,539) | (239,112) |
| 7. Actuarial Value End of Year: (1) + (4) + (5c) + (6e) | 10,907,632 | 6,393,337 | 17,300,969 |
| 8. Excess of Market Value over Actuarial Value: | (198,450) | (118,529) | (316,979) |
| 9. Entry Age Normal Accrued Liability for 0.3% Multiplier | 19,845,539 | 13,887,310 | 33,732,849 |
| 10. Unfunded Entry Age Normal Accrued Liability for 0.3% Multiplier: (9) - (7) | 8,937,907 | 7,493,973 | 16,431,880 |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Actuarial Balance Sheet

The key elements of the actuarial funding process are illustrated in the Actuarial Balance Sheet. The format of the balance sheet captures the essential purpose of an actuarial cost method - the determination of assets sufficient to provide for pension benefits.

The Actuarial Present Value of Current and Prospective Plan Benefits is the liability that must be balanced by Current and Prospective assets. The Present Value of Future Normal Cost Contributions represents the prospective assets from contributions that will be made for costs allocated to the future.

June 30, 2019

Liabilities

| | |
|---|--------------------|
| 1. Actuarial Present Value of Future Benefits | |
| a. Active Participants | \$197,957,897 |
| b. Terminated Vested Participants | 4,608,004 |
| c. Retired Participants | <u>420,136,956</u> |
| d. Total | 622,702,857 |

Assets

| | |
|--|-------------------|
| 1. Current Valuation Assets | |
| a. Actuarial Value of Assets | 471,784,187 |
| 2. Prospective Valuation Assets | |
| a. Unfunded Actuarial Liability | 116,087,776 |
| b. Present Value of Future Normal Cost Contributions | <u>34,830,894</u> |
| 3. Total | 622,702,857 |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Development of Policy Contribution

| | | |
|---|---------------|--------------------|
| 1. Present Value of Future Benefits | | |
| a. Active Participants | | \$197,957,897 |
| b. Terminated Vested Participants | | 4,608,004 |
| c. Retired Participants | | <u>420,136,956</u> |
| d. Total | | 622,702,857 |
| 2. Present Value of Future Normal Costs | | 34,830,894 |
| 3. Actuarial Value of Assets | | 471,784,187 |
| 4. Entry Age Unfunded Accrued Liability: (1d) - (2) - (3) | | 116,087,776 |
| 5. Entry Age Normal Cost | | 6,359,415 |
| 6. Present Value of Future Earnings | | 92,487,965 |
| 7. Payroll | | 16,089,920 |
| 8. Amortization Payment (Level Dollar 20 Year Closed Period from July 1, 2010) 11 years as of July 1, 2019 | | 14,637,088 |
| 9. Policy Contribution: (5) + (8) | | 20,996,503 |
| 10. Policy Contribution as a Percentage of Payroll | | |
| Normal Cost | | 39.52% |
| Amortization Payment | | <u>90.97%</u> |
| Total | | 130.49% |
| 11. Member Portion | <u>Police</u> | <u>Fire</u> |
| 12. City Portion | 20.00% | 15.13% |
| | 110.49% | 115.36% |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Actuarial Methods

Following are brief descriptions of the actuarial cost and asset valuation methods used in the valuation:

Actuarial Cost Method

The Entry Age Normal Cost Method on an individual basis is used. Normal costs are computed as a level percentage of pay.

The Unfunded Entry Age Accrued Liability is amortized as a level dollar amount over a 20 year closed period measured from June 30, 2010. Each year, the amortization period will decrease by 1 until it reaches 0 years as of June 30, 2030.

The Policy Contribution is the sum of the normal cost and amortization payment.

Asset Valuation Method

An asset valuation method is used to help smooth short term fluctuations in market value.

The actuarial value of assets is equal to the prior years actuarial value of assets adjusted as follows:

1. increased with actual contributions for the year;
2. reduced by actual benefit payments and expenses for the year;
3. increased by investment income equal to the assumed rate of return multiplied by the beginning market value;
4. increased by phased in investment gains /(losses)

Each year, the amount of investment income to be phased in is equal to the excess of the plan's actual investment performance in excess of the amount credited under item 3) above. 25% of this amount plus 25% of the similar amounts calculated in each of the three preceding years are summed and recognized as the amount of phased-in gains recognized in the current year. There is no specific corridor around market value in which the resulting value must fall.

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Actuarial Assumptions

Following are the primary actuarial assumptions used in performing the valuation:

Interest Rate (effective July 1, 2019)

6.50% per annum, net of investment expenses. For the previous valuation, the assumption was 7.00% per annum, net of investment expenses.

Annual Pay Increases (effective July 1, 2014)

| <u>Years of Service</u> | <u>Fire</u> | <u>Police</u> |
|-------------------------|-------------|---------------|
| 1 - 12 | N/A | N/A |
| 13 and later | 2.5% | 2.5% |

Final Average Salary Adjustment (effective July 1, 2014)

For Fire Members, the Average Salary at retirement is increased by a factor of 1.09 for Members 40 and older and a factor of 1.03 for Members younger than 40.

For Police Members, the Average Salary at retirement is increased to reflect the assumption that each participant will have the maximum accrual paid out from their continuous operating holiday balance. For Members 40 and older, the maximum accrual amount is quadrupled.

Mortality (effective July 1, 2019)

Pub-2010 Safety Amount-Weighted Mortality Tables for Employees, Healthy Retirees and Disabled Retirees, male and female rates, with generational projection from 2010 using 70% of Scale MP-2018.

For the previous valuation the assumption was RP-2000 Employees and Healthy Annuitant Mortality Tables, male and female rates, with generational projection based on Scale AA and RP-2000 Disabled Mortality Table, male and female rates.

Active deaths are assumed to be 50% duty related and 50% non-duty related.

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Turnover (effective July 1, 2019)

Separation from service for reasons other than disability, death, or age/service retirement. Rate at selected ages are:

| <u>Age</u> | <u>Percentage Terminating in the next Year</u> | |
|------------|--|-------------|
| | <u>Police</u> | <u>Fire</u> |
| 25 | 2.64% | 0.88% |
| 30 | 2.42% | 0.81% |
| 35 | 2.24% | 0.75% |
| 40 | 1.92% | 0.64% |
| 45 | 1.60% | 0.54% |
| 50 | 0.76% | 0.25% |
| 55 | 0.17% | 0.06% |

These rates are 50% of the rates that were used in the previous valuation at all ages.

Forfeiture of City Provided Benefit

A vested member who terminates employment may elect to receive a return of his/her own contributions (ROC) and forfeit any City-provided benefit. The portion of members making such election at selected ages are:

| <u>Age</u> | <u>Percentage Electing ROC</u> |
|--------------|--------------------------------|
| 35 and under | 100% |
| 36 - 54 | grading from 95% to 5% |
| 55 and over | 0% |

Rate of Disability (effective July 1, 2019)

Probability of becoming disabled during the next year. Rates at selected ages are:

| <u>Age</u> | <u>Percentage Becoming Disabled in the Next Year</u> |
|------------|--|
| 20 | 0.12% |
| 25 | 0.15% |
| 30 | 0.17% |
| 35 | 0.21% |
| 40 | 0.29% |
| 45 | 0.45% |
| 50 | 0.93% |
| 55 | 1.90% |

These rates are 50% of the rates that were used in the previous valuation at all ages.

100% of all disabilities are assumed to be duty related.

The Workers Compensation offset to the plan disability benefit is assumed to be zero.

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Rates of Retirement (effective July 1, 2019)

Probability of an eligible member retiring under the age/service provisions during the next year.
Rates are as follows:

| <u>Age</u> | <u>Percentage of Members Eligible for Retirement Assumed to Retire during Year</u> |
|------------|--|
| 45 | 35% |
| 46 | 35% |
| 47 | 35% |
| 48 | 35% |
| 49 | 35% |
| 50 | 35% |
| 51 | 25% |
| 52 | 25% |
| 53 | 25% |
| 54 | 25% |
| 55 | 50% |
| 56 | 50% |
| 57 | 50% |
| 58 | 50% |
| 59 | 50% |
| 60 | 100% |

For the previous valuation, the rates were 25% at ages 45-50 and 20% at ages 51-53. The rates at ages 54-60 are unchanged from the previous valuation.

Dependent Information

For retired members, actual marital status and spouse birth dates are used. For active members, 90% are assumed to be married, with males assumed three years older than their spouses. Members are assumed to have no dependent children.

Cost-of-Living Adjustment (COLA)

Automatic 3% COLA reflected

**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Summary of Plan Provisions

A summary of the current primary provisions of the System are described below. A complete description of the provisions can be found in Sections 2-441 through 2-483 of the Springfield City Code as amended through General Ordinance 6525 adopted May 6, 2019.

Average Salary

Average of the highest three years salary within the last 10 Years of Service. Salary for this calculation is equal to actual salary before deductions, plus payments for unused floating holidays, unused compensatory time, scheduled holidays, Kelly days, pin days and accrued vacation time.

Normal Retirement Age

Eligibility for unreduced benefits upon meeting any of the following:

- Age 50 and 20 Years of Service,
- 25 Years of Service, or
- Age 60.

Age/Service Benefit

A monthly benefit equal to 1/12 of Average Salary times 2.8% times Years of Service. The maximum benefit is 70% of Average Salary.

Normal Form of Payment

The benefit is payable for the member's lifetime. If the member should predecease his/her spouse, the spouse is entitled to a lifetime survivors benefit. The amount of the benefit is a percentage of the Average Salary. The percentage is equal to 25% plus 1-1/8% for each Year of Service over five years, not to exceed 50% in total. There are no optional forms of payment.

Cost of Living Adjustment (COLA)

Every July 1st, the monthly pension is increased by 3% for the following groups of retirees provided pension payment has been paid at least 12 months prior to July 1:

- Age/service retirees age 56 or greater
- Disability retirees of any age

Early Retirement Age

Eligibility for early retirement is satisfied upon attainment of age 55 and completion of five Years of Service.

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Early Retirement Benefit

Determined using regular formula and reducing the result 1/200 for each month by which the benefit start date precedes age 60.

Member Contributions

20.00% of pay for Police Members and 15.13% of pay for Fire Members

Duty Disability

All members are eligible. The monthly benefit is equal to 2/3 of the salary in effect at the time of retirement.

Non-Duty Disability

Employees hired on or before January 1, 2005: A monthly benefit equal to 2.45% of Average Salary times Years of Service. A member must have three Years of Service to be eligible.

Employees hired after January 1, 2005 and before June 1, 2006: A monthly benefit equal to 2.45% of Average Salary times Years of Service. A member must have five Years of Service to be eligible.

In all cases, the minimum/maximum benefits are 25%/50% of Average Salary.

Duty Death in Service

All members are eligible. A monthly benefit to the spouse equal to 50% of salary in effect at time of death. Additional benefits to unmarried children under age 18, but total cannot exceed 75% of pre-death salary.

Non-Duty Death in Service

A member is eligible after completing five Years of Service. The benefit is 25% of Average Salary plus 1 1/8% of Average Salary for each Year of Service in excess of five, not to exceed 50%. Additional benefits to unmarried children under 18 but total benefit cannot exceed 60% of Average Salary.

Return of Contributions

Member contributions are returned to age/service retirees and disability retirees upon commencement of monthly benefits, without interest. Effective July 1, 2019, Police age/service and disability retirees will receive 17.40% of their annual contributions made at the 20.00% contribution rate after July 1, 2019.

Vested members who terminate before eligible for retirement may elect to receive a return of their own contributions without interest. Election of this benefit results in a forfeiture of any City provided benefit.

Eligibility

The Plan is now closed to new employees. Members hired on or after June 1, 2006 have been removed from the Plan and are currently participants in the LAGERS Pension System. Their contributions in this Plan have been refunded, and they are no longer due any benefits. Members hired before June 1, 2006 will continue to earn benefits under the Plan as described above.

**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Summary of Participant Data

| | <u>Police</u> <u>June 30, 2019</u> | <u>Fire</u> <u>June 30, 2019</u> |
|---|---------------------------------------|-------------------------------------|
| 1. Active Participants | | |
| a. Count | 128 | 87 |
| b. Plan Compensation | 9,934,848 | 6,155,072 |
| c. Average Compensation | 77,616 | 70,748 |
| d. Average Age | 45.3 | 46.1 |
| e. Average Service | 19.3 | 18.7 |
| 2. Retired Participants (including Beneficiaries) | | |
| a. Count | 287 | 304 |
| b. Total Monthly Benefits | \$1,131,311 | \$1,157,697 |
| c. Average Monthly Benefits | \$3,942 | \$3,808 |
| d. Average Age at Onset of Disability Retirements | 40.3 | 46.2 |
| 3. Terminated Vested Participants | | |
| a. Count | 18 | 1 |
| b. Total Monthly Benefits | \$34,157 | \$3,442 |
| c. Average Monthly Benefits | \$1,898 | \$3,442 |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Retiree and Beneficiary Distributions

**Fire
Distribution of Age and Service Retirees**

| <u>Age</u> | <u>Number</u> | <u>Total Monthly Pension</u> | <u>Average Monthly Pension</u> |
|------------|---------------|----------------------------------|------------------------------------|
| Under 45 | 0 | \$0 | \$0 |
| 45 – 49 | 5 | 22,975 | 4,595 |
| 50 – 54 | 20 | 78,389 | 3,919 |
| 55 – 59 | 32 | 143,127 | 4,473 |
| 60 – 64 | 24 | 101,417 | 4,226 |
| 65 – 69 | 27 | 127,494 | 4,722 |
| 70 – 74 | 23 | 105,244 | 4,576 |
| 75 – 79 | 30 | 123,315 | 4,111 |
| 80 + | <u>22</u> | <u>81,537</u> | <u>3,706</u> |
| Totals | 183 | \$783,498 | \$4,281 |

**Police
Distribution of Age and Service Retirees**

| <u>Age</u> | <u>Number</u> | <u>Total Monthly Pension</u> | <u>Average Monthly Pension</u> |
|------------|---------------|----------------------------------|------------------------------------|
| Under 45 | 0 | \$0 | \$0 |
| 45 – 49 | 3 | 16,284 | 5,428 |
| 50 – 54 | 27 | 129,905 | 4,811 |
| 55 – 59 | 46 | 206,231 | 4,483 |
| 60 – 64 | 22 | 95,715 | 4,351 |
| 65 – 69 | 27 | 129,334 | 4,790 |
| 70 – 74 | 27 | 111,129 | 4,116 |
| 75 – 79 | 15 | 65,351 | 4,357 |
| 80 + | <u>15</u> | <u>50,814</u> | <u>3,388</u> |
| Totals | 182 | \$804,763 | \$4,422 |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Retiree and Beneficiary Distributions

**Fire
Distribution of Disability Retirees**

| <u>Age</u> | <u>Number</u> | <u>Total Monthly Pension</u> | <u>Average Monthly Pension</u> |
|------------|---------------|----------------------------------|------------------------------------|
| Under 45 | 1 | \$2,834 | \$2,834 |
| 45 – 49 | 4 | 9,257 | 2,314 |
| 50 – 54 | 3 | 7,633 | 2,544 |
| 55 – 59 | 10 | 37,408 | 3,741 |
| 60 – 64 | 6 | 23,233 | 3,872 |
| 65 – 69 | 10 | 41,126 | 4,113 |
| 70 – 74 | 10 | 39,119 | 3,912 |
| 75 – 79 | 10 | 38,337 | 3,834 |
| 80 + | <u>4</u> | <u>12,044</u> | <u>3,011</u> |
| Totals | 58 | \$210,991 | \$3,638 |

**Police
Distribution of Disability Retirees**

| <u>Age</u> | <u>Number</u> | <u>Total Monthly Pension</u> | <u>Average Monthly Pension</u> |
|------------|---------------|----------------------------------|------------------------------------|
| Under 45 | 3 | \$9,138 | \$3,046 |
| 45 – 49 | 7 | 21,508 | 3,073 |
| 50 – 54 | 4 | 11,980 | 2,995 |
| 55 – 59 | 12 | 42,329 | 3,527 |
| 60 – 64 | 12 | 46,888 | 3,907 |
| 65 – 69 | 8 | 30,514 | 3,814 |
| 70 – 74 | 7 | 24,218 | 3,460 |
| 75 – 79 | 3 | 10,303 | 3,434 |
| 80 + | <u>3</u> | <u>9,362</u> | <u>3,121</u> |
| Totals | 59 | \$206,240 | \$3,496 |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Retiree and Beneficiary Distributions

**Fire
Distribution of Beneficiaries**

| <u>Age</u> | <u>Number</u> | <u>Total Monthly Pension</u> | <u>Average Monthly Pension</u> |
|------------|---------------|----------------------------------|------------------------------------|
| Under 45 | 1 | \$772 | \$772 |
| 45 – 49 | 2 | 3,571 | 1,786 |
| 50 – 54 | 2 | 6,900 | 3,450 |
| 55 – 59 | 1 | 1,903 | 1,903 |
| 60 – 64 | 3 | 5,726 | 1,909 |
| 65 – 69 | 5 | 15,426 | 3,085 |
| 70 – 74 | 12 | 30,721 | 2,560 |
| 75 – 79 | 11 | 29,895 | 2,718 |
| 80 + | <u>26</u> | <u>68,293</u> | <u>2,627</u> |
| Totals | 63 | \$163,207 | \$2,591 |

**Police
Distribution of Beneficiaries**

| <u>Age</u> | <u>Number</u> | <u>Total Monthly Pension</u> | <u>Average Monthly Pension</u> |
|------------|---------------|----------------------------------|------------------------------------|
| Under 45 | 0 | \$0 | \$0 |
| 45 – 49 | 1 | 2,753 | 2,753 |
| 50 – 54 | 1 | 2,161 | 2,161 |
| 55 – 59 | 2 | 4,921 | 2,461 |
| 60 – 64 | 3 | 12,349 | 4,116 |
| 65 – 69 | 10 | 24,896 | 2,490 |
| 70 – 74 | 5 | 11,336 | 2,267 |
| 75 – 79 | 11 | 29,019 | 2,638 |
| 80 + | <u>13</u> | <u>32,869</u> | <u>2,528</u> |
| Totals | 46 | \$120,304 | \$2,615 |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Distribution of Active Police Participants by Age and by Years of Service
(as of June 30, 2019)

| Attained Age | YEARS OF CREDITED SERVICE | | | | | | | | | | Total | |
|-----------------|---------------------------|---------------|---------------|-----------------|-----------------|-----------------|-----------------|-----------------|-----------------|------------------|-------|-----|
| | Under 1 No. | 1 to 4 No. | 5 to 9 No. | 10 to 14 No. | 15 to 19 No. | 20 to 24 No. | 25 to 29 No. | 30 to 34 No. | 35 to 39 No. | 40 and up No. | | |
| Under 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 to 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 to 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 to 39 | 0 | 0 | 0 | 4 | 13 | 0 | 0 | 0 | 0 | 0 | 0 | 17 |
| 40 to 44 | 0 | 0 | 0 | 0 | 29 | 12 | 0 | 0 | 0 | 0 | 0 | 41 |
| 45 to 49 | 0 | 0 | 0 | 0 | 23 | 36 | 0 | 0 | 0 | 0 | 0 | 59 |
| 50 to 54 | 0 | 0 | 0 | 0 | 4 | 5 | 0 | 0 | 0 | 0 | 0 | 9 |
| 55 to 59 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 60 to 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 65 to 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 70 and up | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 4 | 71 | 53 | 0 | 0 | 0 | 0 | 0 | 128 |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Distribution of Active Fire Participants by Age and by Years of Service
(as of June 30, 2019)

| Attained Age | YEARS OF CREDITED SERVICE | | | | | | | | | | Total | |
|--------------|---------------------------|--------|--------|----------|----------|----------|----------|----------|----------|-----------|-------|----|
| | Under 1 | 1 to 4 | 5 to 9 | 10 to 14 | 15 to 19 | 20 to 24 | 25 to 29 | 30 to 34 | 35 to 39 | 40 and up | | |
| | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | No. | |
| Under 25 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 25 to 29 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 30 to 34 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 35 to 39 | 0 | 0 | 0 | 9 | 4 | 0 | 0 | 0 | 0 | 0 | 0 | 13 |
| 40 to 44 | 0 | 0 | 0 | 3 | 7 | 6 | 0 | 0 | 0 | 0 | 0 | 16 |
| 45 to 49 | 0 | 0 | 0 | 4 | 18 | 18 | 1 | 0 | 0 | 0 | 0 | 41 |
| 50 to 54 | 0 | 0 | 0 | 2 | 7 | 6 | 0 | 0 | 0 | 0 | 0 | 15 |
| 55 to 59 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 2 |
| 60 to 64 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 65 to 69 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 70 and up | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 18 | 36 | 32 | 1 | 0 | 0 | 0 | 0 | 87 |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Summary of Changes in Participant Data

| | <u>Active Participants</u> | <u>Retired Participants</u> | <u>Terminated Vested Participants</u> | <u>Total</u> |
|--|--------------------------------|---------------------------------|---|--------------|
| Count as of July 1, 2018 | 235 | 575 | 18 | 828 |
| New Entrants | 0 | 0 | 0 | 0 |
| Rehires | 0 | 0 | 0 | 0 |
| Age and Service Retirements | (17) | 18 | (1) | 0 |
| Duty Disability Retirements | (1) | 1 | 0 | 0 |
| Non-Duty Disability Retirements | 0 | 0 | 0 | 0 |
| Duty Related Deaths | 0 | 0 | 0 | 0 |
| Non-Duty Related Deaths | 0 | 0 | 0 | 0 |
| Vested Terminations - Received Refund | 0 | 0 | 0 | 0 |
| Vested Terminations - No Refund | (2) | 0 | 2 | 0 |
| Nonvested Terminations - Received Refund | 0 | 0 | 0 | 0 |
| Nonvested Terminations - No Refund | 0 | 0 | 0 | 0 |
| Deceased with Beneficiary | 0 | (4) | 0 | (4) |
| New Beneficiaries | 0 | 4 | 0 | 4 |
| Deceased without Beneficiary | 0 | (4) | 0 | (4) |
| Received Refund | 0 | 0 | 0 | 0 |
| Data Corrections | <u>0</u> | <u>1</u> | <u>0</u> | <u>1</u> |
| Total Changes | <u>(20)</u> | <u>16</u> | <u>1</u> | <u>(3)</u> |
| Count as of June 30, 2019 | <u>215</u> | <u>591</u> | <u>19</u> | <u>825</u> |

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**City of Springfield
Police Officers' and Fire Fighters' Retirement System**

June 30, 2019 Actuarial Valuation

Actuarial Standard of Practice No. 51 (ASOP 51)

The purpose of this appendix is to identify, assess, and provide illustrations of risks that are significant to the Plan, and in some cases to the Plan's participants.

The results of the actuarial valuation are based on one set of reasonable assumptions. However, it is almost certain that future experience will not exactly match the assumptions. As an example, investments may perform better or worse than assumed in any single year and over any longer time horizon. It is therefore important to consider the potential impacts of these potential differences when making decisions that may affect the future financial health of the Plan, or of the Plan's participants.

In addition, as plans mature they accumulate larger pools of assets and liabilities. This increases the potential risk to plan funding and the finances of those who are responsible for plan funding. As an example, it is more difficult for a plan sponsor to deal with the effects of a 10% investment loss on a plan with \$1 Billion in assets and liabilities than if the same plan sponsor is responsible for a 10% investment loss on a plan with \$1 Million in assets and liabilities. Since pension plans make long-term promises and rely on long-term funding, it is important to consider how mature the plan is today, and how mature it may become in the future.

Actuarial Standard of Practice No. 51 (ASOP 51) addresses these issues by providing actuaries with guidance for assessing and disclosing the risk associated with measuring pension liabilities and the determination of pension plan contributions. Specifically, it directs the actuary to:

- Identify risks that may be significant to the plan.
- Assess the risks identified as significant to the plan.
- Disclose plan maturity measures and historical information that are significant to understanding the plan's risks.

ASOP 51 states that if in the actuary's professional judgment, a more detailed assessment would be significantly beneficial in helping the individuals responsible for the plan to understand the risks identified by the actuary, then the actuary should recommend that such an assessment be performed.

This appendix uses the framework of ASOP 51 to communicate important information about: significant risks to the Plan, the Plan's maturity, and relevant historical Plan data.

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Maturity Risk

- Definition: This is the potential for total plan liabilities to become more heavily weighted toward inactive liabilities over time.
- Identification: The Plan is subject to maturity risk because as Plan assets and liabilities continue to grow, the impact of any gains or losses on the assets or liabilities also becomes larger.
- Assessment: Currently assets are equal to 10.7 times last year's contributions indicating a one-year asset loss of 10% would be equal to 1.1 times last year's contributions.

Retirement Risk

- Definition: This is the potential for participants to retire and receive subsidized benefits more valuable than expected.
- Identification: This plan has valuable early retirement benefits. If participants retire at earlier ages than anticipated by the actuarial assumptions, it is expected that additional funding will be required.

Investment Risk

- Definition: The potential that investment returns will be different than expected.
- Identification: To the extent that actual investment returns differ from the assumed investment return, the plan's future assets, funding contributions and funded status may differ significantly from those presented in this valuation.

Interest Rate Risk

- Definition: The potential that interest rates will be different than expected.
- Identification: The pension liabilities reported herein have been calculated by computing the present value of expected future benefit payments using the interest rate(s) described in the report. If interest rate(s) in future valuations are different from those used in this valuation, future pension liabilities, funding contributions and funded status may differ significantly from those presented in this valuation. As a general rule, using a higher interest rate to compute the present value of future benefit payments will result in a lower pension liability, and vice versa. One aspect that can be used to estimate the impact of different interest rates is the plan's duration.
- Assessment: If the interest rate changes by 1%, the estimated percentage change in pension liability is approximately 10%.

Demographic Risks

- Definition: The potential that mortality or other demographic experience will be different than expected.
- Identification: The pension liabilities reported herein have been calculated by assuming that participants will follow patterns of demographic experience (e.g. mortality, withdrawal, disability, retirement, form of payment election, etc.) as described in the report. If actual demographic experience or future demographic assumptions are different from what is assumed to occur in this valuation, future pension liabilities, funding contributions and funded status may differ significantly from those presented in this valuation.

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