



Louisville Firefighter's Pension Fund

Actuarial Valuation and Report

January 1, 2020

Table of Contents

Introduction	1
Summary of Report.....	1
Contribution Components Under the Fund	1
Summary of Current Contribution Requirements.....	1
Description of Actuarial Funding Method	2
Advance Funding of Cost of Living Benefits	3
Funding Under Alternative Assumptions.....	3
Summary of Participant Data	3
Risk Discussion.....	5
Summary of Plan Provisions.....	5
Summary of Actuarial Assumptions and Methods	10
Actuarial Certification	11
Appendix.....	11
Table 1 – Active Participants	11
Table 2 – Projected Schedule of Benefit Payments	12
Table 3 – Determination of Valuation Assets.....	12
Table 4 – Determination of Supplemental Liability Bases.....	14
Table 5 – Determination of Employer Contribution – January 1, 2020.....	15
Table 6 – Yearly Comparison of Selected Plan Information.....	17

Introduction

An actuarial valuation of the disability, death and retirement benefits provided under the Louisville Firefighter's Pension Fund, as contained in Chapter 32 of the Codified General Ordinances of the Louisville Metro Government, was performed as of January 1, 2020. The purpose of the valuation was to determine the funding requirements of the Fund, with the intention that funding requirements indicated by the valuation be used as the basis for contributions to the Fund for the fiscal year commencing July 1, 2020, in accordance with the Ordinance.

The following report contains the results of an actuarial valuation performed by Findley, Inc. These results were based on participant data, information provided by the administrative office of the Fund, and upon Trust Fund asset information provided by the Fund custodian for the following accounts: Pension Fund A – NAM (#1533200), Retirement Account (#3034542), Sweep Account (#9002758), and Operating Account (#3034550).

Per our discussions with Louisville Metro Office of Management and Budget in 2017, we have included the Operating Account (#3034550) and Sweep Account (#9002758) in our valuation assets. Please note that we have not reconciled the activity in these accounts, and therefore have not determined if there should be any adjustments for payables or receivables as of December 31, 2019. The activity in the other accounts (NAM Account and Retirement Account) has been reconciled. Also, we have not included any of the assumed future administrative expenses in the liabilities for the plan (i.e., only pension benefits are included as liabilities).

The actuarial method employed in this valuation is set forth in Section 32.168 of the Ordinances, and the actuarial assumptions used in this report are the same as those used in the previous year's report. The interest rate assumption is set by the Louisville Metro Finance Department. A detailed explanation of all assumptions is contained in the Summary of Actuarial Assumptions section of this report. In addition, liabilities and costs under alternative assumptions have been analyzed.

Summary of Report

Contribution Components Under the Fund

Plan benefits are funded by two contribution components:

- (a) employee contributions representing 7% of total pay (not including state salary supplement), and
- (b) an actuarially determined contribution payable by the City to fund liabilities over and above those expected to be satisfied by other contributions to the Trust Fund.

The first component is no longer applicable as of October 21, 1995, due to the retirement of the last active participant of the Fund. The second component is commonly called the employer contribution.

Summary of Current Contribution Requirements

Based on the January 1, 2020 actuarial valuation of the Fund, an employer contribution to be applied to the fiscal year beginning July 1, 2020, has been determined. This cost is as follows:

Employer Contribution	\$ 943,960
-----------------------	------------

Each year's valuation recognizes actuarial gains and losses which occur because of deviations of actual plan experience from anticipated plan experience. Such gains and losses for a year are aggregated into a net gain or loss which is reflected in either higher employer contribution levels in future years (net actuarial loss) or lower contributions in future years (net actuarial gain). The Fund experienced a net actuarial gain for the year

of \$733,714. This amount is comprised of an approximate gain of \$1,522,000 attributable to investment return (based on asset valuation method), an approximate loss of \$380,000 due to the cost-of-living increases granted, with the remaining net loss of approximately \$408,000 being attributable to plan experience. These gains and losses are amortized over 15 years.

We have amortized accrued liabilities over the time period set forth in Ordinance section 32.168. However, with an average age of approximately 80 for the members and beneficiaries, we feel that the amortization of future bases should be completed by some earlier date. We prepared a separate memorandum report in 2012 which analyzed the impact in the valuation results if the actuarial assumptions and valuation methods were modified to reflect assumptions and methods which we would recommend. Please advise us if the Board or the Metro Finance Department wishes to see a similar analysis performed for this year's valuation.

GASB 68 calculations for reporting pension liabilities and expense on government financial statements are provided in a separate report.

Description of Actuarial Funding Method

The actuarial method by which the employer contribution is to be determined is set forth in Section 32.168 of the Ordinance. This section of the Ordinance was last changed effective with the January 1, 1985 actuarial valuation of the Fund.

The employer contribution is determined under an aggregate variation of the Entry Age Normal Funding Method, and is calculated in two pieces. The first piece is the "normal cost" and is evaluated in terms of the normal cost accrual rate. This is the percentage of payroll for active participants which would be exactly sufficient to provide all needed funds if the plan had been in effect without amendment since the first covered employee came to work and would continue without amendment until the last covered employee retired, and all actuarial assumptions were exactly realized. This portion of the annual funding requirement has disappeared due to the fact that no active participants remain in the plan.

The second piece of the total employer contribution is an amount which is intended to amortize the "unfunded supplemental liability". The unfunded supplemental liability is sometimes referred to as the "unfunded past service liability", but that language is misleading. The unfunded supplemental liability is simply the amount by which current assets fall short of the assets that would be on hand if prior normal costs had been accumulated, at the current level, since the first employee came to work. The unfunded supplemental liability is itself composed of a number of components which are separately amortized. However, all such components as of January 1, 1989 were considered completely amortized due to the transfer to CERS.

Each actuarial gain or loss is amortized over 15 years from the date it is established. Each additional supplemental liability component arising from an ordinance change or change in actuarial assumptions is amortized over 30 years from the date of establishment, except for the 2005 benefit increases, which are amortized over 15 years. The handling of the unfunded supplemental liability and its various components is described in Section 32.168(B) of the Metro Government Code of Ordinances.

In the long run, the cost of a pension plan will depend on the benefits actually paid. Actuarial assumptions and/or funding methods may affect the incidence of the cost (and, thereby, the interest available to pay part of future benefits), but do not in and of themselves affect the actual value of the benefits. Nevertheless, it is appropriate and desirable to have a long-term approach to the funding of a pension plan which insures that funds will be available when needed, and that the cost of the plan will be spread equitably among generations of taxpayers and plan participants.

Advance Funding of Cost of Living Benefits

The 2005 amendment to the Ordinance added Section 32.170(D) which provides for annual cost-of-living increases effective each July 1 (beginning July 1, 2006) based on the increase in the Consumer Price Index for the previous calendar year. We believe that future cost-of-living increases should be recognized in the actuarial valuation; however, the Ordinance specifically precludes future increases from being recognized in the actuarial valuation. Therefore, annual cost-of-living increases will be treated as an actuarial loss each year.

Funding Under Alternative Assumptions

The actuarial assumptions used in this valuation include mortality under the RP-2000 Mortality Table and an interest rate of 7.00%. In addition, we have noted that, by Ordinance, we cannot recognize future cost-of-living increases in the valuation used to determine the employer contribution; however, we believe the Metro Government should be aware of the liabilities and cost associated with these increases. Therefore, we have set forth below a listing of Present Value of Future Benefits and the Employer Contribution under an array of different cost-of-living increase assumptions. However, previous comments concerning the amortization periods of liability bases as required by the Ordinance should also be considered (for example, the liability increases attributable to the change in these assumptions is being amortized over 30 years).

Interest Rate	– Cost of Living Assumption –			
	0%	1%	2%	3%
<u>Present Value of Benefits</u>				
7.0%	\$16,195,541	\$17,087,060	\$18,067,304	\$19,148,589
<u>Employer Contribution</u>				
7.0%	\$943,960	\$1,015,805	\$1,094,799	\$1,181,936

Summary of Participant Data

A summary of the participant data used in the January 1, 2019 and January 1, 2020 actuarial valuation is provided below.

	<u>2019</u>	<u>2020</u>	<u>Percentage Change</u>
Active Participants:			
Number of participants on valuation date	0	0	0.00%
Inactive Participants:			
Number of Retired, Disabled and Beneficiaries	135	132	(2.22%)
Total monthly pensions in payment status	\$ 199,072	\$ 200,380	0.66%
Average monthly benefits	\$ 1,475	\$ 1,518	2.94%
Total monthly deferred pensions	\$ 0	\$ 0	0.00%

Louisville Firefighter's Pension Fund
January 1, 2020

Average age:	80.36	81.32	1.19%
Median age:	80.40	81.34	1.17%

Risk Discussion

Actuarial Standard of Practice No. 51

Effective November 1, 2018, actuarial funding valuation reports are required to include a discussion of the risk associated with measuring pension obligations and determining pension plan contributions. The risks that may reasonably be anticipated to significantly affect the plan's future financial condition are discussed below.

Investment Risk

Due to the plan's substantial equity exposure, investment returns will likely be much more volatile than liability valuations. Therefore, there is a risk that the funded status of the plan could be volatile. We recommend a more detailed assessment be performed to provide the plan sponsor with a better understanding of this risk.

Longevity Risk

Since all benefits are paid as annuities, the plan is sensitive to changes in overall population longevity. As a result, the liabilities will increase if participants live longer than expected and decrease if they live shorter than expected.

Other Demographic Factors

The Ordinance Section 32.170(D) provides for annual cost-of-living increases effective each July 1 (beginning July 1, 2006); however, the Ordinance specifically precludes future increases from being recognized in the actuarial valuation. Therefore, annual cost-of-living increases will produce an actuarial loss each year. Please see page 3 of our report for a more detailed discussion of this risk.

Legislation Risk

As we have discussed before, the Ordinances (Ordinance Section 32.168) currently amortize the Ordinance changes and the actuarial gains and losses over a 15 year period and Assumption changes over a 30 year period. However, with an average age of approximately 81 for the members and beneficiaries, we feel that the amortization of future bases should be completed by some earlier date. Please see page 2 of our report for a more detailed discussion of this risk.

Contribution Risk

Contribution risk involves a plan sponsor not making contributions sufficient to adequately fund the plan. Plans that have a mandatory minimum required contribution under IRS rules and regulations generally contribute at least the minimum required contribution amount. The IRS mandated minimum will help to preserve a reasonable funded level in the future. Plans that are not covered by IRS rules and regulations regarding minimum required contributions (such as plans sponsored by governmental entities) often face competing demands for capital and difficult choices must be made.

Governmental entities subject to Governmental Accounting Standards Board (GASB) requirements should have an "Actuarially Determined Contribution (ADC)", which is calculated to preserve a reasonable funded status if contributed every year. Unlike private-sector plans, there are no Federal penalties imposed if the ADC is not contributed in full, thus making these plans more susceptible to Contribution Risk.

Summary of Plan Provisions

This summary is not a Summary Plan Description or a plan document. You should not rely solely on this summary in making a determination of eligibility for the plan or its benefits.

Eligibility

Effective January 1, 1989, no new members are allowed to enter the plan.

Service Credits

For purposes of both eligibility and benefits, service is granted cumulatively for periods of service in the Department, except as noted for special circumstances.

For purposes of determining amounts of benefits only, a member shall have his service credit increased for unused sick leave. In calculating such additional credit, one month's service will be credited for each ten days of accumulated unused sick leave.

Normal Retirement

Condition

At his own election, any member who has completed 20 years of service (25 years of service if hired on or after July 1, 1984) with the Department may make written application for retirement. Any member who has both completed 20 years of service (25 years of service if hired on or after July 1, 1984) and reached age 62 shall be expected to file an application for retirement except under special circumstances.

Benefit

The monthly benefit, payable on the last day of each month, is based on a percentage of Average Salary. If a member was hired prior to July 1, 1984, his percentage is determined in accordance with Schedule A below. If a member is hired on or after July 1, 1984, his percentage is determined in accordance with Schedule B.

<u>SCHEDULE A</u>		<u>SCHEDULE B</u>	
Full Years of Service	Percentage of Average Salary*	Full Years of Service	Percentage of Average Salary*
Less than 20 years	2% for each year	Less than 25 years	2% for each year
20 but less than 21 years	50%	25 but less than 26 years	56%
21 but less than 22 years	53	26 but less than 27 years	59
22 but less than 23 years	56	27 but less than 28 years	62
23 but less than 24 years	59	28 but less than 29 years	65
24 but less than 25 years	62	29 but less than 30 years	68
25 but less than 26 years	65	30 but less than 31 years	71
26 but less than 27 years	68	31 but less than 32 years	74
27 but less than 28 years	71	32 years or more	75
28 but less than 28 years, 4 months	74		
28, years 4 months or more	75		

* If such retiring member's service is greater than 28 years and 4 months (32 years if hired on or after July 1, 1984) and such member is entitled to credit for accumulated unused sick leave then each month of

such credit in excess of 28 years and 4 months (32 years if hired on or after July 1, 1984) shall result in a 1/12 of 1% increase in the percentage to be applied to Average Salary.

"Average Salary" means the sum of the three highest fiscal years of annual base salary, plus scheduled overtime pay, plus salary supplement, as established in the City Employee's Classification and Compensation Ordinance, divided by 36 months.

Effective July 1, 2005 members and beneficiaries received benefit increases as follows:

<u>Annual Pension Prior to Increase</u>	<u>Increased Annual Benefit</u>
Less than \$9,600	Greater of \$9,600 or add \$800
\$9,600 - \$20,000	Add \$800
\$20,000 - \$30,000	Greater of \$20,800 or add \$600
\$30,000 or more	Greater of \$30,600 or add \$400

Resignation or Dismissal

A member who terminates his service either by resignation or dismissal after completion of 10 years of service, but before he is eligible for normal retirement under item (3) above, shall receive a refund of his contributions to the Fund without interest.

Any member who terminates service, elects to receive a refund of his contributions, and is re-employed on or after July 1, 1973, may repay, within one year of re-employment, such contributions with interest at 6% per year from the date of payment. He shall then receive credit for past service prior to his date of termination. If such contributions, with interest, are not repaid upon re-employment, credit for past service shall not be restored.

Disability Retirement

Condition

There are three types of disability retirement allowed:

- (1) total and permanent occupational disability caused by in line-of-duty injuries (requires no service with respect to eligibility for benefits);
- (2) total and permanent disability resulting from line-of-duty causes (requires no service eligibility requirements, except that in the instance of heart or lung disease, five years of service is required for eligibility of benefits), and
- (3) total and permanent disability arising in any manner other than that listed in (1) or (2) above (requires the completion of five years of service with respect to eligibility for benefits).

Disability retirement shall not be approved if the disability is not deemed to be permanent or where the disability is incurred in off-duty employment. *Benefit*

Benefit amount depends on the type of disability retirement as follows:

- (1) a member retiring due to occupational in line-of-duty injury shall receive a monthly pension equal to 75% of the sum of his monthly base salary, plus schedule overtime pay, plus the salary supplement determined at the time of such disability.

- (2) a member retiring due to line-of-duty causes shall receive a monthly pension equal to a percentage of the sum of his monthly base salary, plus scheduled overtime pay, plus the salary supplement at the time of disability. If a member was hired prior to July 1, 1984, his percentage is determined in accordance with Schedule A below. If a member is hired on or after July 1, 1984, his percentage is determined in accordance with Schedule B below.

<u>SCHEDULE A</u>		<u>SCHEDULE B</u>	
Full Years of Service	Percentage of Average Salary*	Full Years of Service	Percentage of Average Salary*
20 but less than 21 years	50%	25 but less than 26 years	56%
21 but less than 22 years	53	26 but less than 27 years	59
22 but less than 23 years	56	27 but less than 28 years	62
23 but less than 24 years	59	28 but less than 29 years	65
24 but less than 25 years	62	29 but less than 30 years	68
25 but less than 26 years	65	30 but less than 31 years	71
26 but less than 27 years	68	31 but less than 32 years	74
27 but less than 28 years	71	32 years or more	75
28 but less than 28 years, 4 months	74		
28, years 4 months or more	75		

- (3) a member retiring due to disability arising from other causes not listed in (1) or (2) above shall receive a monthly pension equal to a percentage of his Average Salary at the time of disability. Such percentage is based on full years of service in accordance with either Schedule A or Schedule B above depending on date of hire; however, the percentage is applied to his Average Salary as opposed to monthly salary.

Dependent and Estate Benefits

Condition

There are four types of dependent and estate benefits allowed:

- (1) death in line-of-duty of an active member (requires no service with respect to eligibility for benefits).
- (2) death other than in line-of-duty of an active member (requires the completion of five years of service with respect to eligibility for benefits).
- (3) death of a retired or disabled member.

In the cases of (1), (2), or (3) above, the pension is payable to an eligible surviving spouse until the death or remarriage of such spouse and then to any unmarried, dependent children or to dependent parents.

- (4) death of a member in line-of-duty or after the completion of five years of service who is not survived by an eligible spouse, unmarried dependent children or dependent parents. *Benefit*

The benefit amount depends on the type of death, as follows:

- (1) the monthly dependent's benefit payable due to death of an active member in line-of-duty shall equal 75% of monthly salary (which equals the sum of base salary, plus scheduled overtime, plus the salary supplement) at the time of death.
- (2) the monthly dependent's benefit payable due to death of an active member not in line-of-duty shall be a percentage multiplied by the monthly salary, including the sum of base salary, plus scheduled overtime, plus the salary supplement, at time of death, where such percentage equals 50% plus .5% for each six months, or major fraction thereof, of service in excess of 20 years; such percentage shall not exceed 60%. Provided, however, the benefit shall not be less than the benefit the dependent would have received had the member elected to retire immediately prior to death.
- (3) the monthly dependent's benefit payable due to death of a retired or disabled member shall be the same monthly pension that was being paid to the member.
- (4) the lump sum estate benefit payable due to death of a member without surviving spouse, unmarried dependent children or dependent parents based on conditions in (a)(4) above, is the greater of the total contributions made by the member or \$1,000.

Worker's Compensation

Any member who is disabled in the line-of-duty and who files for and receives benefits from Worker's Compensation, shall not have such award deducted (or offset) from any benefits payable under the Pension Fund.

Pension Increase after Retirement or Death

Prior to 2005 pensions being paid to retired members and surviving spouses and dependents are updated and increased for cost of living purposes on an ad-hoc rather than pre-determined basis; the cost associated with these increases are paid separately and are not recognized in the annual actuarial valuations.

Effective July 1, 2006, and each July 1 thereafter, increases shall be provided based on the percentage increase in the Consumer Price Index for all Urban Consumers for the prior calendar year, but not to exceed 5%. The Metro Council reserves the right to suspend or reduce such increases.

Pension Fund Sources

- (a) Each active member contributes 7% of the gross amount of all pay received (excluding any state salary supplement).
- (b) Proceeds of taxes or other revenues appropriated by the Metro Council in order to fund the actuarially determined liabilities in accordance with an annually determined actuarial contribution.
- (c) Miscellaneous gifts, devises and bequests of money or property which are received by the Fund.

Investment and Custody of Pension Fund

The Board of Trustees of the Pension Fund sets investment policy, and employs money managers, and designates a corporate trustee to act as custodian of the fund, under the supervision of the Board. The Director of Finance is custodian of all funds not managed by a corporate trustee or money manager.

Administration

The system is administered by the Board of Trustees of the Pension Fund.

Summary of Actuarial Assumptions and Methods

(Sample Values per 1,000 Lives)

Age			
55	65	75	85

Mortality Rates

RP-2000 Mortality Table for Healthy Annuitants (static)

Males	5.91	13.42	37.83	110.76
Females	3.53	10.36	28.11	77.45

Assumed future mortality improvement – None (due to average age and collar)

Withdrawal and Retirement Rates

No longer applicable

Salary Scale

No longer applicable

Rate of Investment Return

7.00% per annum

Future Cost-of-Living Increases

None, as required by Section 32.140(D) of the governing Ordinance

Valuation Method

Entry Age Normal Funding Method (an aggregate variation), with actuarial gains and losses amortized over 15 years. Supplemental liabilities resulting from ordinance changes and/or changes in actuarial assumptions occurring after June 30, 1985 amortized over 30 years, except for April 2005 Ordinance change which is amortized over 15 years.

Asset Valuation Method

Book value is adjusted by the weighted average difference between book and market values during the most recent four years, but not outside the range of book and market values. This amount is then adjusted for accrued receivables and payables. This asset valuation method treats unrealized gains and losses differently from realized gains and losses. Thus, asset turnover can cause a significant change in the actuarial value of assets.

Eligible Spouse

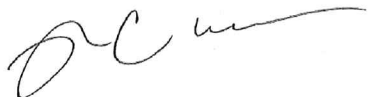
Based on exact information provided by the Administrative Office

Changes in Assumptions From Prior Actuarial Valuation

None

Actuarial Certification

The actuarial valuation summarized in this report has been performed utilizing generally accepted actuarial principles and is based on actuarial methods required by Ordinance. It is my opinion that the results of this valuation fully and fairly disclose the actuarial position of the plan on the valuation date, subject to the qualifications indicated in the Introduction and Summary of Report sections of this report. I am a consulting actuary for Findley, Inc., and a member of the American Academy of Actuaries and meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion herein.



Ryan C. Weddle, FSA, EA, MAAA

Fellow, Society of Actuaries

March 13, 2020

Date

Appendix

Table 1 – Active Participants

There are no active members remaining in the plan.

Table 2 – Projected Schedule of Benefit Payments

CALENDAR YEAR	<u>TOTAL PROJECTED BENEFITS</u>			
	NO COLA	1% COLA	2% COLA	3% COLA
2020	2,346,219	2,346,219	2,346,219	2,346,219
2021	2,217,453	2,239,627	2,261,802	2,283,976
2022	2,085,932	2,127,860	2,170,204	2,212,966
2023	1,952,698	2,011,866	2,072,218	2,133,766
2024	1,818,827	1,892,678	1,968,756	2,047,105
2025	1,685,374	1,771,345	1,860,789	1,953,811
2026	1,553,353	1,648,915	1,749,328	1,854,785
2027	1,423,748	1,526,450	1,635,439	1,751,030
2028	1,297,437	1,404,938	1,520,154	1,643,554
2029	1,175,223	1,285,324	1,404,500	1,533,399
2030	1,057,871	1,168,548	1,289,539	1,421,691
2031	946,112	1,055,547	1,176,371	1,309,640
2032	840,633	947,246	1,066,126	1,198,542
2033	742,045	844,516	959,914	1,089,718
2034	650,820	748,101	858,744	984,424
2035	567,278	658,592	763,482	883,801
2036	491,545	576,375	674,786	788,785
2037	423,555	501,619	593,080	700,073
2038	363,091	434,310	518,583	618,138
2039	309,795	374,266	451,312	543,227

The above estimates are based on the assumptions set forth in the Summary of Actuarial Assumptions section.

Table 3 – Determination of Valuation Assets

a. **Determination of Book and Market Value of Assets - December 31, 2019**

<u>Account</u>	<u>Book Value</u>		<u>Market Value</u>		<u>Accrued Income</u>
Commonwealth Bank & Trust Co.					
Louisville Firefighters Pen Fd A - NAM	\$	9,786,310	\$	11,731,171	\$ 1
Totals	\$	9,786,310	\$	11,731,171	\$ 1

b. Determination January 1, 2020 Valuation Assets

1. Trust Fund History (Louisville Firefighters Pen Fd A - NAM)

Year							
Ending	Book Value	Market Value	Difference	Weight	Weighted Difference		
2019	\$ 9,786,310	\$ 11,731,171	\$ 1,944,861	4	\$ 7,779,444		
2018	9,103,221	10,275,773	1,172,552	3	3,517,656		
2017	9,104,961	10,880,062	1,775,101	2	3,550,201		
2016	7,241,190	7,553,241	312,051	1	312,051		

2. Total Weighted Difference \$ 15,159,354

3. Adjustment to Assets 1,515,935
(2) / Sum of Weights

4. Valuation Assets 11,302,245

5. Accrued Income December 31, 2018 1

6. Accrued Contribution 0 *

7. Cash Balance in Retirement Account #3034542 283,070

8. Cash Balance in Sweep Account #9002758 195,274

9. Cash Balance in Operating Account #3034550 10,000

10. Total Valuation Assets \$ 11,790,590
(4) + (5) + (6) + (7) + (8) + (9)

Market Value of Assets excluding Acc. Contribs 11,790,590

* Per discussion with Angela Baker on March 11, 2020, Louisville Metro Government contributed \$1,377,900 for the 2019 plan year during 2019, and no additional contributions are anticipated for the 2019 plan year.

c. Past Investment Returns

Market Value	Valuation Assets
26.35%	22.68%
(4.60%)	0.89%
20.19%	11.46%
5.09%	4.65%

<u>Year End</u>		
	1.52%	1.38%
December 31, 2019	7.82%	13.80%
December 31, 2018	21.62%	14.00%
December 31, 2017	11.44%	9.63%
December 31, 2016	4.13%	5.10%
December 31, 2015	5.50%	5.31%
December 31, 2014		
December 31, 2013		
December 31, 2012		
December 31, 2011		
December 31, 2010		

The equivalent compound rate of annual return for the latest periods are:

Latest year	26.35%	22.68%
Two-year	9.79%	11.25%
Three-year	13.15%	11.32%
Four-year	11.08%	9.62%
Five-year	9.10%	7.92%
Six-year	8.88%	8.88%
Seven-year	10.62%	9.59%
Eight-year	10.72%	9.60%
Nine-year	9.97%	9.09%
Ten-year	9.51%	8.70%

Market value returns exclude the Operating and Sweep Accounts.

Table 4 – Determination of Supplemental Liability Bases

a. Determination of January 1, 2020 Supplemental Liability Bases		
1.	Unfunded Supplemental Liability, January 1, 2019	\$ 6,090,248
2.	Amortization Payment, January 1, 2019	
	(a) Employer Contribution, Beginning of Year	1,287,740
	(b) Employer Contribution, End of Year	1,377,882
	(c) Actual 2019 Contribution	1,377,900
	(d) Amortization Payment, January 1, 2019 (a*(c/b))	1,287,757
3.	Interest on Net Liability, [(1) - (2)(d)] x 7.0%	336,174
4.	Expected Unfunded Supplemental Liability, January 1, 2020	
	(1) - (2)(d) + (3)	\$ 5,138,665
5.	Actual Unfunded Supplemental Liability, January 1, 2020	4,404,951

6. Total Supplemental Liability Base Established January 1, 2020, (5) - (4)	(733,714)
(a) Base due to Ordinance Change	0
(b) Base due to Assumption Change	0
(c) Base due to Actuarial Loss (Gain)	\$ (733,714)

b. Maintenance of Supplemental Liability Bases

Year		Amort.	Years	Original	Amort.	Outstanding
<u>Estab.</u>	<u>Reason Established</u>	<u>Period</u>	<u>Remaining</u>	<u>Amount</u>	<u>Payment</u>	<u>Balance</u>
2006	Ordinance Change	15	1.0	3,419,478	64,727	64,727
2006	Assumption Change	30	13.8	3,027,044	230,502	2,141,159
2006	Actuarial Loss	15	1.0	514,822	9,743	9,743
2007	Actuarial Loss	15	1.1	422,859	44,089	49,194
2008	Actuarial Loss	15	2.1	644,924	67,108	133,492
2009	Actuarial Loss	15	3.0	2,068,926	214,867	602,808
2010	Actuarial Loss	15	3.9	1,400,532	145,179	518,059
2011	Actuarial Loss	15	4.9	6,935	717	3,074
2012	Actuarial Gain	15	5.8	(23,785)	(2,457)	(12,152)
2013	Actuarial Loss	15	6.7	116,857	12,049	67,122
2014	Actuarial Loss	15	7.6	99,876	10,281	63,257
2015	Actuarial Gain	15	8.5	(211,691)	(21,756)	(145,689)
2016	Assumption Change	30	22.0	574,506	43,269	512,071
2016	Actuarial Loss	15	9.4	748,864	76,842	553,632
2017	Actuarial Loss	15	10.6	196,618	20,175	158,201
2018	Actuarial Gain	15	13.0	(597,637)	(61,325)	(548,402)
2019	Actuarial Loss	15	14.0	1,008,503	103,484	968,369
2020	Actuarial Gain	15	15.0	(733,714)	(75,288)	(733,714)
					\$882,206	\$4,404,951

Table 5 – Determination of Employer Contribution – January 1, 2020

a. Present Value of Future Benefits

1. Retired Lives	\$ 16,195,541
2. Normal Retirement	0
3. Disability	0
4. Death	0

5. Return of Firefighter's Contributions	0
6. Total (1) + (2) + (3) + (4) + (5)	\$ 16,195,541
b. Determination of Unfunded Supplemental Liability	
7. Accrued Supplemental Liability	\$ 16,195,541
8. Valuation Assets (see Table 3)	11,790,590
9. Unfunded Supplemental Liability (7) - (8)	\$ 4,404,951
c. Determination of Annual Normal Cost	
10. Present Value of Future Normal Cost (6) - (7)	\$ 0
11. Present Value of Future Firefighter Contributions	0
12. Net Present Value of Future Normal Cost (10) - (11)	0
13. Present Value of Future Salary	0
14. Normal Cost Accrual Rate (12) / (13)	0.0000%
15. Total Base Salary	\$ 0
16. a) Normal Cost (14) x (15)	0
b) Normal Cost as a % of Base Salary	0.0000%
d. Determination of Total Employer Contribution	
17. Total Payment Amortizing Unfunded Supplemental Liability (see Table 4)	\$ 882,206
18. Total Annual Cost (16) + (17), but not less than \$0	\$ 882,206
19. Total Annual Cost at Plan Year-End (18) x 1.07 (assumed interest)	\$ 943,960

Table 6 – Yearly Comparison of Selected Plan Information

	<u>1/1/2017</u>	<u>1/1/2018</u>	<u>1/1/2019</u>	<u>1/1/2020</u>
Annual Covered Salary				
(a) Total for All Active Firefighters	\$ 0	\$ 0	\$ 0	\$ 0
(b) Average Increase From Prior Year for all Continuing Firefighters	N/A	N/A	N/A	N/A
Present Value of Future Benefits				
(a) Active	\$ 0	\$ 0	\$ 0	\$ 0
(b) Inactive	18,923,998	17,625,061	16,719,472	16,195,541
(c) Total	18,923,998	17,625,061	16,719,472	16,195,541
Valuation Assets				
(a) Total Valuation Assets	\$ 10,467,353	\$ 11,711,748	\$ 10,629,224	\$ 11,790,590
(b) Approximate Rate of Return	4.65%	11.46%	0.89%	22.68%
Unfunded Supplemental Liability	\$ 8,456,645	\$ 5,913,313	\$ 6,090,248	\$ 4,404,951
Funded Percentage (Valuation Assets/Present Value of Future Benefits)	55.31%	66.45%	63.57%	72.80%
Total Amortization Payment	\$ 1,713,843	\$ 1,163,963	\$ 1,287,740	\$ 882,206
Employer Contribution (Actuarially Determined)	\$ 1,833,812	\$ 1,245,440	\$ 1,377,882	\$ 943,960
Employer Contribution (Actual)	\$ 2,537,660	\$ 1,245,500	\$ 1,377,900	TBD
Benefit Payments During Prior Year	\$ 2,623,877	\$ 2,520,974	\$ 2,423,214	\$ 2,410,878
Consumer Price Index-Urban (Average over Average)	1.30%	2.10%	2.40%	1.80%