Midland Firemen's Relief and Retirement Fund

Actuarial Valuation as of December 31, 2023

May 30, 2024

Mitchell L. Bilbe, F.S.A.
Evan L. Dial, F.S.A.
Philip S. Dial, F.S.A.
Charles V. Faerber, F.S.A., A.C.A.S.
Mark R. Fenlaw, F.S.A.
Brandon L. Fuller, F.S.A.
Christopher S. Johnson, F.S.A.
Oliver B. Kiel, F.S.A.
Dustin J. Kim, F.S.A.

Rudd and Wisdom, Inc.
Consulting Actuaries

Edward A. Mire, F.S.A.
Rebecca B. Morris, A.S.A.
Amanda L. Murphy, F.S.A.
Michael J. Muth, F.S.A.
Khiem Ngo, F.S.A., A.C.A.S.
Timothy B. Seifert, F.S.A.
Raymond W. Tilotta
Ronald W. Tobleman, F.S.A.
David G. Wilkes, F.S.A.

May 30, 2024

Board of Trustees
Midland Firemen's Relief and
Retirement Fund
c/o Ms. Shera Crow
Post Office Box 4296
Midland, TX 79704

Members of the Board of Trustees:

At your request, we have prepared this report of the results of the actuarial valuation of the fund as of December 31, 2023. This valuation was prepared to determine whether the fund has an adequate contribution arrangement.

In a separate report later this year, we will provide the necessary disclosures for the fund's compliance with the Governmental Accounting Standards Board (GASB) Statement No. 67 for the plan year ending December 31, 2023. Similarly, we will provide a separate report containing the pension expense, net pension liability, and disclosure information for the city's compliance with GASB 68 for the fiscal year ending September 30, 2024. GASB 68 prescribes the city's accounting for your fund, while this actuarial valuation report reflects the assumed continuation of the current funding policy.

We certify that we are members of the American Academy of Actuaries who meet Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained in this report.

Sincerely,

Mark R. Fenlaw

Mark R. Fenlaw, F.S.A.

Rebecca B. Morris

Rebecca B. Morris, A.S.A.

MRF/RBM:nlg

i:\clients\fire\wd\vals\2024\midland\midland-12-31-23.docx

9500 Arboretum Blvd., Suite 200
Austin, Texas 78759
www.ruddwisdom.com
Phone: (512) 346-1590
Fax: (512) 345-7437

TABLE OF CONTENTS

Section I

Valuation Summary

An actuarial valuation of the assets and liabilities of the Midland Firemen's Relief and Retirement Fund as of December 31, 2023 has been completed. This valuation is based on **preliminary asset information**. The valuation was based on the Present Plan (plan effective January 1, 2024) and the provisions of the Texas Local Fire Fighters' Retirement Act (TLFFRA) which were in effect on December 31, 2023. Section II shows the key results of the actuarial valuation as of December 31, 2023 and discusses the changes since the prior valuation as of December 31, 2021.

This valuation reflects an actuarially assumed total contribution rate of 38.4%, comprised of 14.2% by the firefighters and 24.2% by the city. The total contribution rate of 38.4% exceeds the normal cost rate of 27.28%, leaving 11.12% available to amortize the unfunded actuarial accrued liability (UAAL) of $120,942,577. Assuming that the total payroll increases at the rate of 3% per year in the future, the contributions in excess of the normal cost **will never amortize the UAAL.**

In order for a retirement plan to have an adequate contribution arrangement, contributions must be made that are sufficient to pay the plan's normal cost and to amortize the plan's UAAL over a reasonable period of time. Based on the Texas State Pension Review Board guidelines for pension funding, our professional judgment, and the actuarial assumptions and methods used in making this valuation, we consider amortization periods of 10 to 25 years to be preferable and 30 years to be the current maximum acceptable amortization period. Since the total contributions are not sufficient to pay the fund's normal cost and to amortize the fund's UAAL within the maximum acceptable period, we are of the opinion that the fund, based on present levels of benefits and contributions, **has an inadequate contribution arrangement. Section III presents considerations for establishing an adequate contribution arrangement.**

The below chart shows what the increased city contribution would need to have been in effect on the respective valuation dates in order for the fund to have a 25-year amortization period.

	City Contribution Rate	
	12/31/2021 Valuation	12/31/2023 Valuation
Current actual contribution rate	22.2%	24.2%
Hypothetical rate for a 25-year amortization period		
• Assumed effective on the valuation date	48.5%	42.5%
• Assumed effective on January 1, 2025	54.25%	44.0%

Plan Provisions

The plan provisions have been amended since the prior actuarial valuation. Effective January 1, 2024, two key changes were approved by the firefighters and the board, (1) to exclude unscheduled overtime pay from the final average pay used to determine benefits and (2) to use the highest 60 consecutive months of pay to determine the final average pay instead of the 60 highest months. The changes were accompanied by an acceptable transition protecting those eligible for normal retirement or within two years of normal retirement eligibility. In addition, the city increased its contribution rate by 2% from 22.2% to 24.2% effective January 1, 2024.

Projected Actuarial Valuation Results

In addition to completing this actuarial valuation, we estimated the amortization periods as of December 31, 2025 and as of December 31, 2027 by making projections from the December 31, 2023 actuarial valuation. These projections examine the effect on the amortization period in the next two biennial actuarial valuations of the actuarial investment gains and losses that the fund experienced in the four years prior to the valuation date (losses in 2020, 2022, and 2023, and a gain in 2021) that have been only partially recognized as of December 31, 2023. As shown in Exhibit 8, a smoothing method is used to determine the actuarial value of assets (AVA) for this valuation. This method phases in over a five-year period any investment gains or losses (net actual investment return greater or less than the actuarially assumed investment return) that the fund has had. The AVA used in this current valuation is deferring recognition of various portions of the gains and losses in 2020-2023 that the fund experienced. The AVA used in this valuation is $91.5 million. The market value of assets (MVA) is $83.7 million. The $7.8 million difference between the MVA and the AVA is the deferred net loss over the past four years that will be recognized in the next two biennial actuarial valuations.

The theory behind the AVA method is to allow time for investment gains and losses to partially offset each other and thereby dampen the volatility associated with the progression of the MVA over time. In practice, the timing and amounts of investment gains and losses can result in irregular effects on the AVA in a given year. However, as intended, the pattern of the AVA is smoother over time than the pattern of the MVA, as seen in Exhibit 9.

For the purpose of projecting the amortization period through 2027 we used six scenarios of various assumed annual rates of investment return, net of investment-related expenses, over the 2024-2027 projection period. These projections show the expected effects over the next four years after the valuation date (1) of the recognition of the portions of the investment gains and losses over the past four years that are deferred as of December 31, 2023, (2) of investment returns over the next four years different from the 7% assumption used in this valuation, and (3) assuming a city contribution rate of 44.0% beginning January 1, 2025 that would have been required to have an amortization period of 25 years. That would be a 19.8% increase over the current city contribution rate of 24.2%.

	Scenario					
	1	2	3	4	5	6
Assumed Investment Return for Calendar Year						
2024	7%	10%	-5%	-10%	-10%	-7%
2025	7	5	0	7	4	2
2026	7	10	10	7	4	2
2027	7	10	10	7	4	2
2028 and later	7	7	7	7	7	7
City Contribution Rate (effective January 1, 2025)	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%
Amortization Period in Years as of December 31:						
2023 (actual)	25.0	25.0	25.0	25.0	25.0	25.0
2025 (projected)	24.6	24.4	26.5	26.8	27.0	26.7
2027 (projected)	23.7	22.8	27.6	28.1	29.3	29.3

The projected future December 31, 2027 valuation in Scenario 1 reveals that instead of decreasing by the expected four years to 21.0 years, the amortization period is projected to decrease by 1.3 years to 23.7 years because of the recognition of the deferred net loss. The other scenarios with investment gains and losses show that there is not much sensitivity of the amortization period. That is not typical of a fund with a 25-year amortization period. The small sensitivity results in this case because of the unrealistically large projected contributions by the city and because of the relatively low funded ratio of 43% as of December 31, 2023.

The primary conclusion from the scenarios is that since the fund has a dramatically inadequate contribution arrangement and a significant deferred net loss that will hinder the amortization of the UAAL, the board needs to demonstrate to the firefighters that additional action needs to be taken to be part of a solution with the city to establish an adequate contribution arrangement. The magnitude of either an increase in the city contribution rate or lump sum contributed by the city alone is too great.

Participant and Asset Data

We have relied on and based our valuation on the active firefighter data, pensioner data, and asset data provided on behalf of the board of trustees by Ms. Shera Crow, the administrator of the fund. We have not audited the data provided but have reviewed it for reasonableness and consistency relative to the data provided for the December 31, 2021 actuarial valuation. Exhibit 1 is a distribution of the active firefighters by age and service. In general, the assumed 2024 compensation used for projecting future contributions for each active firefighter in the valuation was the actual pay for calendar year 2023 increased by 3% to reflect the effect of the 5% general pay increase effective October 1, 2023. The total of these assumed compensation amounts is our assumed annualized covered payroll for the plan year beginning January 1, 2024 and is used in the valuation to determine the UAAL amortization period and to calculate the actuarially determined contribution (ADC) rate. The averages of the assumed compensation amounts for the 2024 plan year are shown in Exhibit 1. For projecting future benefits, we have assumed that the pay excluding unscheduled overtime pay will be 10% less than the pay for making contributions.

Exhibit 2 contains summary information on the pensioners. The monthly benefit payments are generally based on the amounts paid January 31, 2024. Exhibit 3 is a reconciliation of firefighters and pensioners from December 31, 2021 to December 31, 2023. Exhibit 4 shows a breakdown of the dollar amount of the monthly benefits for retirees and surviving spouses. Exhibit 5 shows a historical comparison of the actuarial accrued liability and the actuarial value of assets.

Asset information is contained in exhibits 6 through 10. The summary of assets contained in Exhibit 6 is based on the new target asset allocation and the **preliminary** total assets as of December 31, 2023. This exhibit also shows a comparison with the market values and actuarial values of assets as of December 31, 2021 and December 31, 2023. Exhibit 7 contains the statement of changes in assets for 2023 (preliminary) and 2022. Exhibit 8 shows the development of the actuarial value of assets. Exhibit 9 shows a historical comparison between the market value and actuarial value of assets. A comparison of the market value asset allocation by major asset class as of December 31, 2021 and December 31, 2023 is shown in Exhibit 10.

Assumptions

As a part of each actuarial valuation, we review the actuarial assumptions used in the prior actuarial valuation. As a result of our review, we have selected actuarial assumptions we consider to be reasonable and appropriate estimates of future experience for the fund for the long-term future. Their selection complies with the applicable actuarial standards of practice. Significant actuarial assumptions used in this valuation are:

1. 7% annual investment return net of investment-related expenses;

2. 3% general annual compensation increase combined with promotion, step, and longevity increases that average 2.89% per year over a 30-year career;

3. 3% aggregate payroll growth (for the purpose of amortizing the UAAL and calculating the ADC rate);

4. Retirement rates which result in an average expected age at retirement of 53.6;

5. PubS-2010 (public safety) total dataset mortality tables for employees and for retirees, projected for mortality improvement generationally using the projection scale MP-2019; and

6. Pay excluding unscheduled overtime pay will be 10% less than the pay for making contributions.

The actuarial assumptions for this December 31, 2023 actuarial valuation are the same as those used in the December 31, 2021 valuation. A summary of all the assumptions and methods used in the valuation is shown in Exhibits 11 and 12. In our opinion, the assumptions used, both in the aggregate and individually, are reasonably related to the experience of the fund and to reasonable expectations. The assumptions represent a reasonable estimate of anticipated experience of the fund over the long-term future.

Supporting Exhibits

Exhibit 13 contains definitions of terms used in this actuarial valuation report. Exhibit 14 summarizes the plan provisions of the Present Plan. Appendix A documents our review of the economic assumptions.

Funding Policy

A funding policy in compliance with state law would say that each actuarial valuation will include a benchmark actuarially determined contribution (ADC) rate using a closed amortization period of 30 years beginning January 1, 2020. The components of the ADC rate are the normal cost and the amortization cost, both expressed as contribution rates. Then the fund's actuary is to compare the benchmark ADC rate and the total contribution rate. The table below shows the actuarial valuation results in two key metrics, the amortization period and the total contribution rate. The amortization period for the benchmark ADC began at 30 years for the December 31, 2019 valuation and declines by one each year; so it is at 26 years for this actuarial valuation.

	Amortization Period	Total Contribution Rate
Benchmark ADC rate	26.0 years	56.1%
Actuarial valuation	never	38.4%
Difference	(immeasurable)	(17.7)%

That much negative divergence from the benchmark means that the board's next steps include (1) working with Rudd and Wisdom to study potential changes that would establish an appropriate balance between benefits and contributions and (2) working with the firefighters and the city to achieve the necessary changes. Section III of this report gives the board some recommended potential changes for study.

Variability in Future Actuarial Measurement

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 current economic or demographic assumptions;
- Increases or decreases expected as part of the natural operation of the methodology used for these measurements;
- Changes in economic or demographic assumptions; and
- Changes in plan provisions.

Analysis of the potential range of such future measurements resulting from the possible sources of measurement variability will be provided in the next biennial actuarial valuation once an adequate contribution arrangement has been established.

Respectfully submitted,
RUDD AND WISDOM, INC.

Mark R. Fenlaw

Mark R. Fenlaw
Fellow, Society of Actuaries
Member, American Academy of Actuaries

Rebecca B. Morris

Rebecca B. Morris
Associate, Society of Actuaries
Member, American Academy of Actuaries

Section II

Key Results of the Actuarial Valuations

	December 31, 2021[1]	December 31, 2023[1]	December 31, 2023[2]
1. Actuarial present value of future benefits			
a. Those now receiving benefits or former firefighters entitled to receive benefits	$106,761,734	$116,767,189	$116,767,189
b. Firefighters	164,001,081	189,736,230	165,218,316
c. Total	$270,762,815	$306,503,419	$281,985,505
2. Actuarial present value of future normal cost contributions	$ 69,985,878	$ 82,330,358	$ 69,575,030
3. Actuarial accrued liability (Item 1c – Item 2)	$200,776,937	$224,173,061	$212,410,475
4. Actuarial value of assets	$ 91,653,825	$ 91,467,898	$ 91,467,898
5. Unfunded actuarial accrued liability (UAAL) (Item 3 - Item 4)	$109,123,112	$132,705,163	$120,942,577
6. Contributions (percent of pay)			
a. Firefighters	14.20%	14.20%	14.20%
b. City of Midland	22.20%	22.20%	24.20%
c. Total	36.40%	36.40%	38.40%
7. Normal cost (percent of payroll)	31.54%	31.38%	27.28%
8. Percent of payroll available to amortize the UAAL (Item 6c - Item 7)	4.86%	5.02%	11.12%
9. Annualized covered payroll	$ 22,052,445	$ 25,874,745	$ 25,874,745
10. Years to amortize the UAAL	never	never	never
11. Funded ratio (Item 4 ÷ Item 3)[3]	45.6%	40.8%	43.1%
12. Retiree funded ratio (Item 4 ÷ Item 1a)[4]	85.8%	78.3%	78.3%

[1] All items reflect the plan provisions before the changes effective January 1, 2024.
[2] All items reflect the plan provisions effective January 1, 2024.
[3] The funded ratio is not appropriate for assessing either the need for or the amount of future contributions or the adequacy of the assumed contribution rates. Using the market value of assets instead of the actuarial value of assets for Item 11 would have resulted in funded ratios of 46.7% as of December 31, 2021 and 39.4% as of December 31, 2023 with the plan provisions effective January 1, 2024. **The best indicator of the fund's health will be Item 10 once an adequate contribution arrangement is established.**
[4] The retiree funded ratio should ideally never be less than 100%.

Changes in the Unfunded Actuarial Accrued Liability

In comparing this actuarial valuation to the prior one, the UAAL increased by $11,819,465 from $109,123,112 as of December 31, 2021 to $120,942,577 as of December 31, 2023. The table below summarizes the reasons for the increase.

Reason for Change	Amount
• Expected increase (interest on UAAL more than expected amortization payments, accumulated with interest)	$ 13,486,410
• Change in benefit provisions	(11,762,586)
• Investment loss for the two years (based on the AVA average annual return of 3.0%)	7,534,789
• Experience loss (net difference between actual experience and assumed experience for pay increases, retirements, mortality, and terminations)	2,560,852
Total	$ 11,819,465

Changes in the ADC

Since the UAAL will never be amortized based on the benefit provisions and the contribution arrangement reflected in this December 31, 2023 actuarial valuation, it is impossible to analyze changes since the December 31, 2021 actuarial valuation in terms of the amortization period. Instead, the below shows an analysis in terms of an actuarially determined contribution rate by the city (ADC) that with the 14.2% contribution rate by the firefighters would be adequate to pay the normal cost and to amortize the UAAL in 25 years beginning on the actuarial valuation date. The beginning point in the December 31, 2021 actuarial valuation report was an ADC of 48.5%. The ending point is the December 31, 2023 actuarial valuation with an ADC of 42.5%. The items below identify changes and experience since the prior actuarial valuation and the resulting decrease in the ADC of 6.0% from the 48.5% two years ago to the 42.5% in this actuarial valuation.

1. The average annual rate of investment return, net of investment-related expenses, on the market value of assets during the two plan years 2022 and 2023 was -2.5%. However, the actuarial value of assets (AVA) used in the valuation and the determination of the amortization period is based on an adjusted market value. The average annual rate of return on the AVA, net of investment-related expenses, for plan years 2022 and 2023 was 3.0%, less than the assumed rate of return for those years of 7.0%. This resulted in an increase in the ADC of 2.1%.

2. The shortfall in contributions due to the starting 48.5% ADC not being contributed in 2022 and 2023 increased the ADC by 3.6%.

3. The aggregate payroll increased at an average rate of 8.3% per year instead of the assumed 3% per year rate, which caused the ADC to decrease by 3.6%.

4. The net result of all experience compared to the assumptions, other than the investment experience and the aggregate payroll experience, had the combined effect of increasing the ADC by 0.6%.

5. The changes in benefit provisions resulted in a decrease in the ADC of 7.1%.

6. Starting over with a new 25-year amortization period instead of staying at 23 years with the elapse of two years between the actuarial valuation dates decreased the ADC by 1.6%.

Section III

Establishing an Adequate Contribution Arrangement

The results of this actuarial valuation as of December 31, 2023, reflecting the changes in plan provisions and the increase in the city contribution rate effective January 1, 2024, reveal that the fund still has an inadequate contribution arrangement. There are three options for establishing an adequate contribution arrangement: (1) a sufficient increase in the total contribution rate, (2) a package of sufficient decreases in benefits, or (3) a sufficient combination of increases in contributions and decreases in benefits. A lump sum contribution is also a possibility in combination with any of the three normal options.

Without any additional changes in plan provisions, we showed in Section I the higher city contribution rate of 44.0% (assumed effective January 1, 2025) that would result in an amortization period of 25 years as of December 31, 2023. An increase of 19.8% in the city's contribution rate is unrealistic. Alternatively in lieu of an increase in the contribution percentage, a lump sum of $80.6 million would be needed. Even with the proposed lump sum contribution of $47 million by the city, there would still leave a required increase in the city rate of around 8.3%, both assumed effective as of January 1, 2025.

Because of these unrealistic contribution rate increases, the board will need to consider combining the $47 million lump sum contribution with a package of decreases in benefits and an increase in the firefighter contribution rate. At your request, we recommended studies in an April 25, 2024 letter of the effects on the fund's December 31, 2023 actuarial valuation of each of the potential changes in benefit provisions described below. Given that additional changes may be needed, this is an ideal time to improve the benefit design and features of the plan and to reduce the normal cost to a more manageable level for the long-term sustainability of the fund.

1. Change the benefit formula from 75% of final average salary for the first 20 years of service plus $80 for each year of service above 20 years to a set of graded percents of final average salary that will reduce the benefit for the first 20 years and increase the benefit for years above 20 years (3.3% per year for the first 20 years, 2.0% per year for years 21-30, and 1.0% per year for years above 30).

2. Discontinue the supplemental benefit for those retiring after the plan change effective date at age 50 or above of $500 per month.

3. Increase by two years the minimum age and service requirements for all of the DROP plan benefits (from age 50/20 years to age 52/22 years and from 25 years at any age to 27 years at any age).

4. Discontinue the crediting of interest in the determination of a DROP lump sum.

5. Exclude firefighter contributions from the determination of a DROP lump sum.

6. Make the Reverse DROP actuarially equivalent to the normal retirement benefit by changing the reduction factor for the monthly benefit from 90% to the appropriate percentage based on a 7% interest rate assumption and an appropriate gender-neutral mortality assumption (expected to be close to 80%).

7. Change the benefit formula definition of final average salary from the highest 60-month average to the highest 84-month average, both being consecutive number of months.

We will determine the effects on the actuarial accrued liability and the normal cost percent for each of the potential changes individually as well as collectively. In addition, we will study what effect the collective package of potential changes plus the potential $47 million lump sum contribution from the city would have toward establishing an adequate contribution arrangement. In addition, we will solve for what additional financing with the collective package and the $47 million lump sum would be required, expressed both as a lump sum and as an increase in the total contribution rate.

The fund is subject to the state law known as the Funding Soundness Protection Plan. It requires the board and the city to work together to finalize a package of changes that will result in an amortization period of 30 years or less by September 1, 2025. For the fund, that effectively means a package of changes based on this December 31, 2023 actuarial valuation. We recommend targeting 25 years because of the very adverse investment experience of 2022 that is only partially recognized in this December 31, 2023 actuarial valuation.

Exhibit 1

Distribution of Firefighters by Age and Service on December 31, 2023 with Average Annual Compensation

Years of Service	Age									Total	Average Compen-sation
	Under 25	25-29	30-34	35-39	40-44	45-49	50-54	55-59	60 or Over		
0	2	4	5	4	0	0	0	0	0	15	$ 57,000
1	11	10	5	1	0	0	0	0	0	27	62,780
2	4	5	4	3	0	1	0	0	0	17	78,770
3	3	10	5	7	0	0	0	0	0	25	93,087
4	1	6	9	3	1	0	0	0	0	20	92,418
5	1	3	1	5	0	0	0	0	0	10	93,978
6	0	4	5	4	2	0	0	0	0	15	91,510
7	0	2	2	1	0	0	0	0	0	5	107,394
8	0	3	3	1	2	0	0	0	0	9	105,033
9	0	1	5	2	0	1	0	0	0	9	116,043
10	0	1	4	1	5	1	0	0	0	12	116,918
11	0	0	1	3	2	0	0	0	0	6	112,839
12	0	0	1	3	2	0	0	0	0	6	117,462
13	0	0	0	0	1	0	0	0	0	1	161,867
14	0	0	0	0	1	1	0	0	1	3	141,107
15	0	0	0	3	1	0	0	0	0	4	125,537
16	0	0	0	1	6	0	2	0	0	9	132,587
17	0	0	0	3	7	2	1	0	0	13	128,119
18	0	0	0	2	3	1	0	0	0	6	139,262
19	0	0	0	0	2	1	0	0	0	3	129,311
20-24	0	0	0	0	3	11	3	0	0	17	142,992
25-29	0	0	0	0	0	4	7	2	1	14	151,589
30-34	0	0	0	0	0	0	0	1	1	2	166,928
35+	0	0	0	0	0	0	0	0	1	1	129,511
Totals	22	49	50	47	38	23	13	3	4	249	$103,915

Average Compensation	$67,739	$92,127	$124,172	$139,810	$153,685	
	$83,767	$104,602	$135,111	$166,289	$103,915	

Average age	35.8
Average years of service	9.2
Average age at hire	26.6

Exhibit 2

Summary of Pensioner Data

Type of Benefit	Pensioner Data Used in December 31, 2023 Valuation	
	Number of Recipients	Total Monthly Benefit Payments
Service Retirement	159[1]	$ 736,308
Disability Retirement	4	13,107
Vested Terminated (Deferred)	8	20,307
Surviving Spouse	30	74,034
Surviving Child	8	6,281
Total	209	$ 850,037

Type of Benefit	Comparison of Pensioner Count by Type as of The Prior and Current Actuarial Valuations			
	December 31, 2021	New	Ceased	December 31, 2023
Service Retirement	150[1]	+13	-4	159[1]
Disability Retirement	4	0	0	4
Vested Terminated (Deferred)	7	+3	-2	8
Surviving Spouse	33	+2	-5	30
Surviving Child	6	+2	0	8
Total	200	+20	-11	209

[1] Includes seven alternate payees receiving benefits according to the terms of a Qualified Domestic Relations Order (QDRO).

Exhibit 3

Firefighter and Pensioner Reconciliation

	Firefighters	Current Payment Status	Vested Terminated Firefighters	Total
1. As of December 31, 2021	230	193 [1]	7	430
2. Change of status				
a. retirement	(9)	11	(2)	0
b. disability	0	0	0	0
c. death	(1)	(5)	0	(6)
d. survivor payment begins	0	4	0	4
e. withdrawal	(29)	0	0	(29)
f. vested termination	(1)	0	1	0
g. QDRO alternate payee	0	0	0	0
h. child benefit ceases	0	0	0	0
i. correction	0	(2)	2	0
j. net changes	(40)	8	1	(31)
3. New firefighters	59	0	0	59
4. As of December 31, 2023	249	201 [1]	8	458

[1] Includes seven alternate payees receiving benefits according to the terms of a Qualified Domestic Relations Order (QDRO).

Exhibit 4

Breakdown of Monthly Benefit Payment Amounts as of December 31, 2023

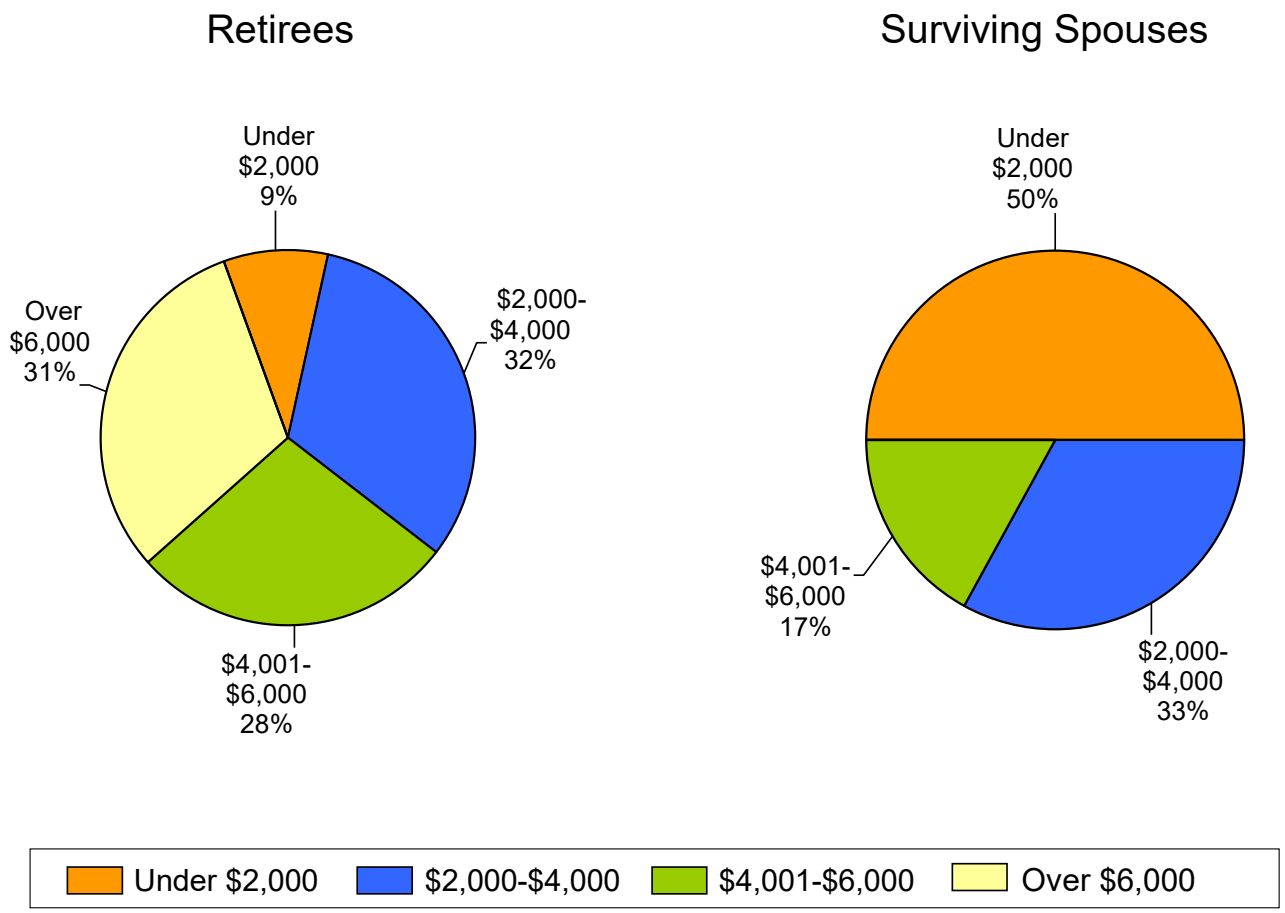


Exhibit 5

Historical Comparison of Actuarial Accrued Liability and Actuarial Value of Assets (Present Plan Valuations as of December 31)

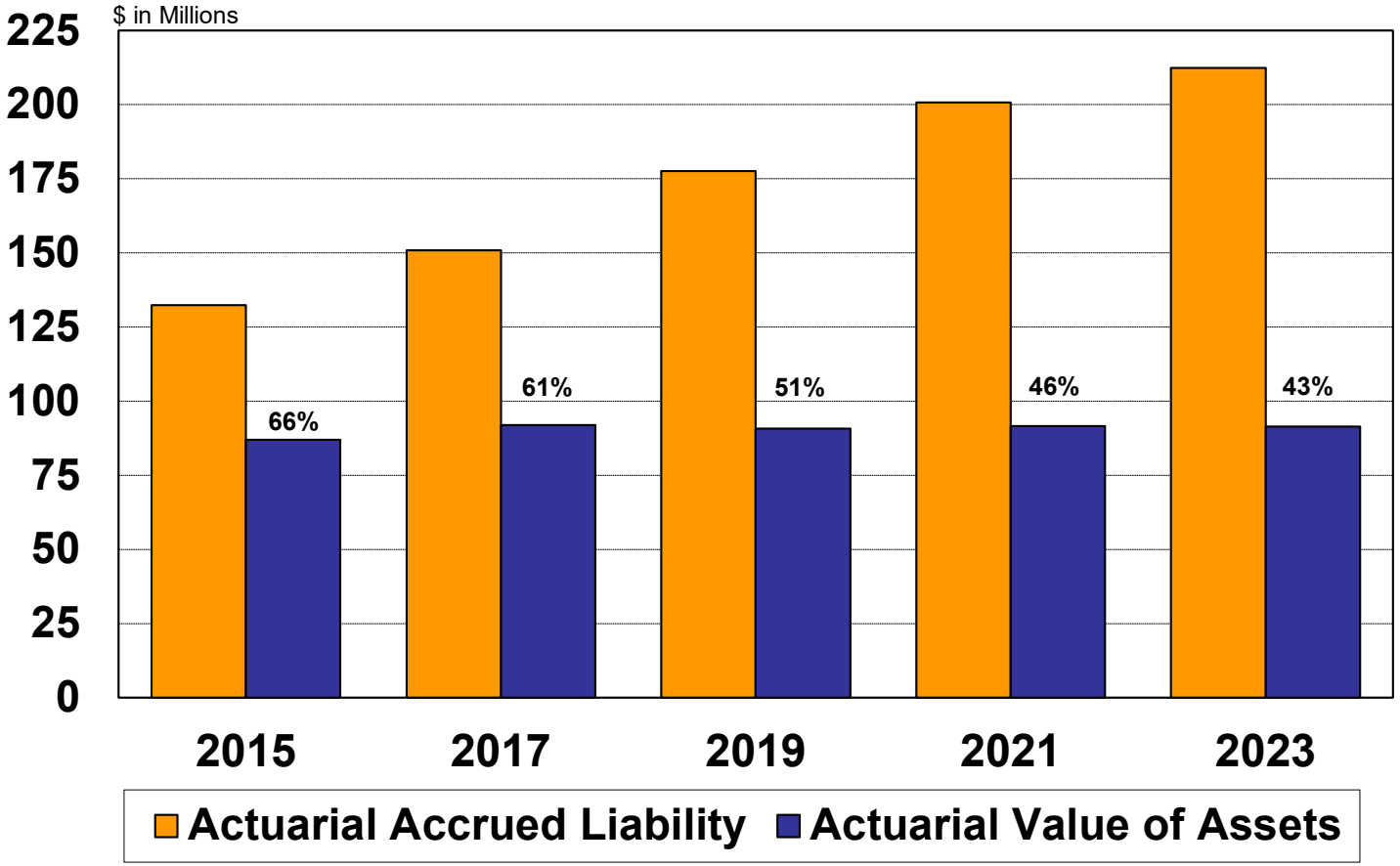


Exhibit 6

Summary of PRELIMINARY Asset Data

Asset Type	Market Value as of December 31, 2023	Target Allocation As a Percent of Grand Total
Equities		
U.S. Large Cap		20%
U.S. Small/Mid Cap		5
International		15
Total		40
Alternatives		
Venture Capital/Private Equity		15
Real Estate		10
Master Limited Partnerships		10
Private Credit		5
Total		40
Fixed Income		15
Cash Equivalents, Net of Payables		5
Grand Total	$83,710,694 [1]	100%

[1] The grand total is the preliminary amount for the December 31, 2023 financial report. The invested amounts are not shown, instead the new investment consultant's target asset allocation is solely shown.

Comparison of Asset Values as of the Prior and Current Actuarial Valuation Dates		
	December 31, 2021	December 31, 2023
Market Value	$93,771,847	$83,710,694
Actuarial Value	$91,653,825	$91,467,898
Actuarial Value as a Percent of Market Value	97.7%	109.3%

Exhibit 7

Statement of Changes in Audited Assets for the Years Ended December 31, 2023 and 2022

	12/31/2023 Preliminary	12/31/2022
Additions		
1. Contributions		
a. Employer	$ 5,580,525	$ 5,201,025
b. Employees	3,569,340	3,326,782
c. Total	$ 9,149,865	$ 8,527,807
2. Investment Income		
a. Interest and dividends	$ 1,000,000[1]	$ 958,504
b. Net appreciation in fair value	5,034,586[1]	(10,514,724)
c. Total	$ 6,034,586[1]	$ (9,556,220)
3. Other Additions	0	389
Total Additions	**$ 15,184,451**	**$ (1,028,024)**
Deductions		
4. Benefit Payments	$ 11,553,195	$ 10,875,344
5. Expenses		
a. Investment-related	$ 500,000[1]	$ 500,264
b. General administrative	400,000[1]	388,777
c. Total	$ 900,000[1]	$ 889,041
Total Deductions	**$ 12,453,195**	**$ 11,764,385**
Net Increase in Assets	**$ 2,731,256**	**$(12,792,409)**
Market Value of Assets (Fiduciary Net Position)		
Beginning of Year	$ 80,979,438	$ 93,771,847
End of Year	$ 83,710,694	$ 80,979,438
Rate of Return		
Net of All Expenses	6.44%	(11.28)%
Net of Investment-Related Expenses	6.95%	(10.88)%
Gross	7.61%	(10.37)%
Direct Investment-Related Expenses	0.66%	0.51%

[1] Estimated.

Exhibit 8

Development of Actuarial Value of Assets

Calculation of Actuarial Investment Gain/(Loss) Based on Market Value for Plan Years Ending December 31				
	2023	2022	2021	2020
1. Market Value of Assets as of beginning of year	$80,979,438	$93,771,847	$86,345,309	$84,848,966
2. Firefighter Contributions	3,569,340	3,326,782	3,138,754	2,867,985
3. City Contributions	5,580,525	5,201,025	4,907,065	4,483,675
4. Benefit Payments and Administrative Expenses[1]	(11,953,195)	(11,264,121)	(13,075,523)	(10,686,490)
5. Expected Investment Return[2]	5,570,444	6,468,258	6,287,284	6,238,616
6. Expected Market Value of Assets as of end of year	83,746,552	97,503,791	87,602,889	87,752,752
7. Actual Market Value of Assets as of end of year	83,710,694	80,979,438	93,771,847	86,345,309
8. Actuarial Investment Gain/(Loss)	(35,858)	(16,524,353)	6,168,958	(1,407,443)
9. Market Value Rate of Return Net of Expenses	6.95%	(10.88)%	14.86%	5.81%
10. Rate of Actuarial Investment Gain/(Loss)	(0.05)%	(17.88)%	7.36%	(1.69)%

[1] Administrative expenses are included for all years to retroactively make the investment return assumption net of investment-related expenses.
[2] Assuming uniform distribution of contributions and payments during the plan year; annual investment return assumed to be 7.0% for 2022 and 2023 and 7.5% for 2020 and 2021.

Plan Year	Investment Gain/(Loss)	Deferral Percentage	Deferred Gain/(Loss) as of 12/31/2023
2023	$ (35,858)	80%	$ (28,686)
2022	(16,524,353)	60%	(9,914,612)
2021	6,168,958	40%	2,467,583
2020	(1,407,443)	20%	(281,489)
Total			$ (7,757,204)

Actuarial Value of Assets as of December 31, 2023	
11. Market Value of Assets as of December 31, 2023	$ 83,710,694
12. Deferred Gain/(Loss) to be Recognized in Future	(7,757,204)
13. Preliminary Value (Item 11 – Item 12)	$ 91,467,898
14. Corridor for Actuarial Value of Assets	
a. 80% of Market Value as of December 31, 2023 (minimum)	$ 66,968,555
b. 120% of Market Value as of December 31, 2023 (maximum)	$100,452,833
15. Actuarial Value as of December 31, 2023	$ 91,467,898
16. Write Up/(Down) of Assets (Item 15 – Item 11)	$ 7,757,204

Exhibit 9

Historical Comparison of Market and Actuarial Value of Assets
(Valuation as of December 31)

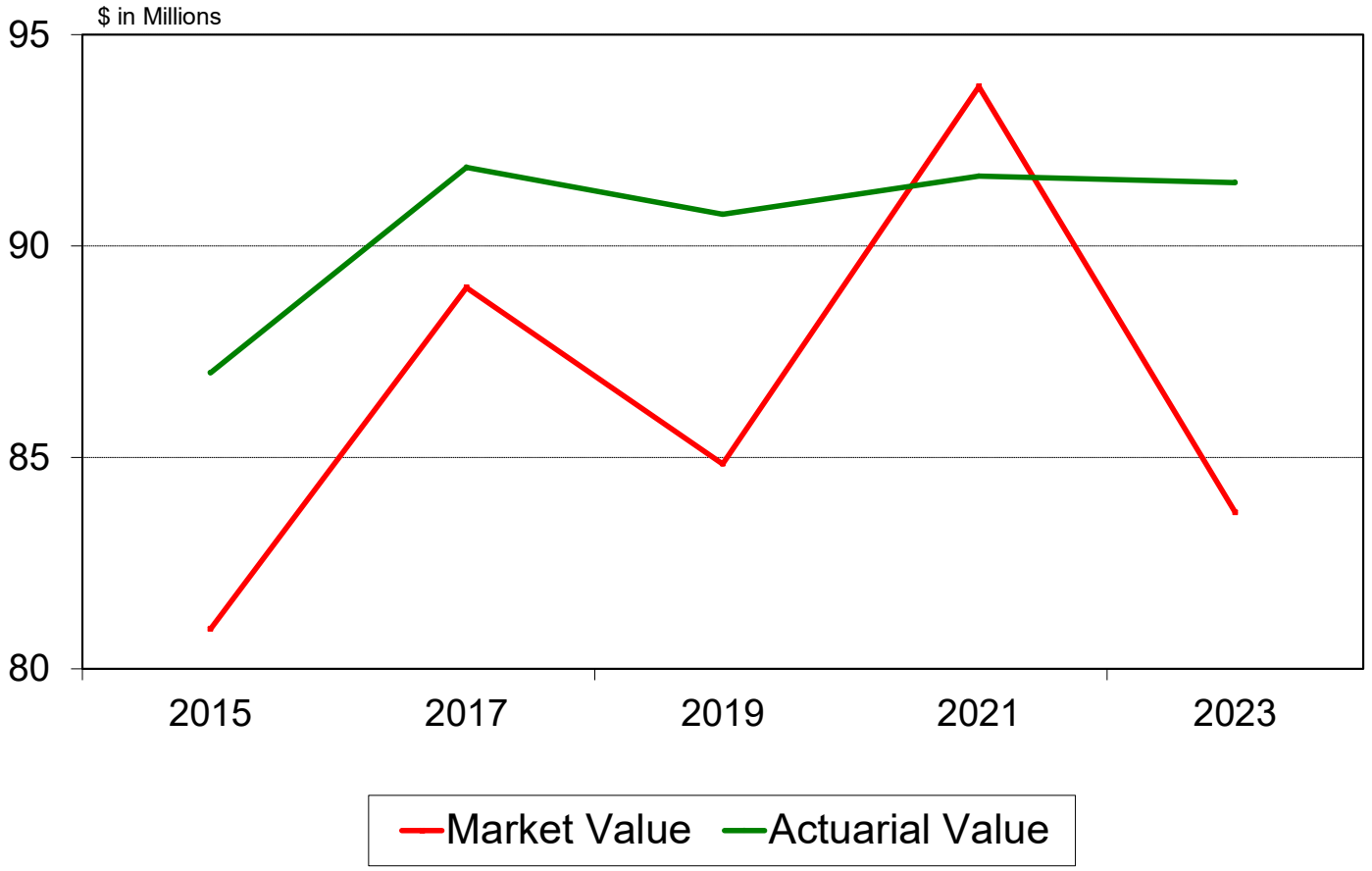
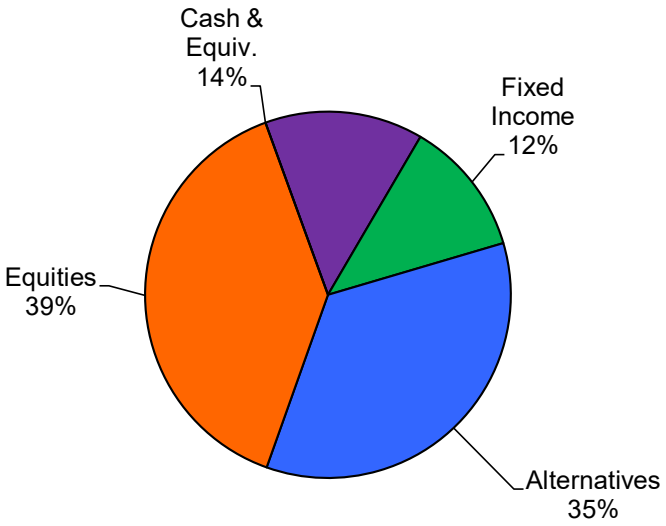


Exhibit 10

Market Value Asset Allocation for Prior and Current Actuarial Valuation Dates

December 31, 2021



December 31, 2023

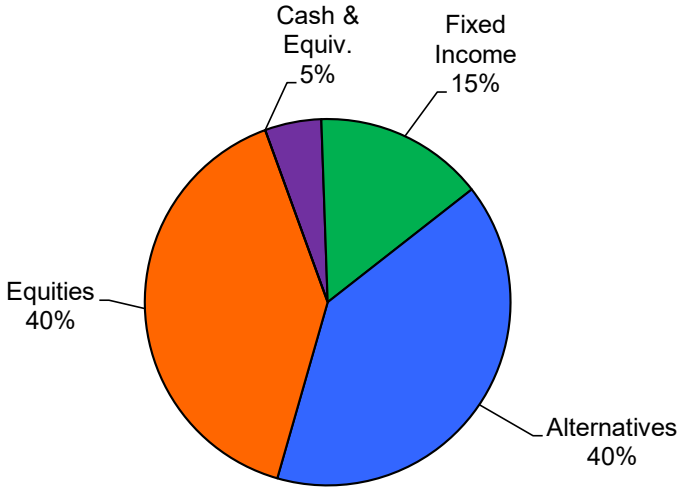


Exhibit 11

Actuarial Methods and Assumptions

A. Actuarial Methods

1. Actuarial Cost Method

The Entry Age Actuarial Cost Method is an actuarial cost method in which the actuarial present value of projected benefits of each active firefighter included in the valuation is allocated as a level percentage of compensation over the period from age at hire to the last age before 100% assumed retirement. Each active firefighter's normal cost is the current annual contribution in a series of annual contributions which, if made throughout the firefighter's total period of employment, would fund his expected benefits. Each firefighter's normal cost is calculated to be a constant percentage of his expected compensation in each year of employment. The normal cost for the fund is the sum of the normal costs for each active firefighter for the year following the valuation date. The normal cost as a percent of payroll reflects that contributions are made biweekly.

The fund's actuarial accrued liability is the excess of the actuarial present value of projected benefits over the actuarial present value of all future remaining normal cost contributions. The unfunded actuarial accrued liability (UAAL) is the amount by which the actuarial accrued liability exceeds the actuarial value of assets. The UAAL is recalculated each time a valuation is performed. Experience gains and losses, which represent deviations of the UAAL from its expected value based on the prior valuation, are determined at each valuation and are amortized as part of the newly calculated UAAL.

2. Amortization Method

The UAAL is assumed to be amortized with level percentage of payroll contributions (total assumed contribution rate less normal cost contribution rate) based on assumed payroll growth of 3% per year. The actuarial determination of the amortization period reflects that contributions are made biweekly.

3. Actuarial Value of Assets Method

All assets are valued at market value with an adjustment made to uniformly spread actuarial gains or losses (as measured by actual market value investment return vs. expected market value investment return) over a five-year period. The total adjustment amount shall be limited as necessary such that the actuarial value of assets shall not be less than 80% of market value nor greater than 120% of market value. See Exhibit 8.

B. Actuarial Assumptions

As a part of each actuarial valuation, we review the actuarial assumptions used in the prior actuarial valuation. The investment return assumption is reviewed using the building block approach that includes several asset allocations, assumed real rates of return for each asset class, an assumed rate of investment-related expenses, and an assumed rate

of inflation, with all assumptions for the long-term future. Our economic assumptions are influenced both by long-term historical experience and by future expectations of investment consultants and economists, but we select the economic assumptions and try to discuss them with the board before completing the actuarial valuation. See our review of the economic assumptions in Appendix A.

We review the termination and retirement experience since the prior valuation and periodically look back more than two years. We also periodically review the average salaries by years of service to get insights into the promotion, step, and longevity compensation patterns for the purpose of reviewing our compensation increase assumption. For the mortality assumptions, we use an appropriate published mortality table with projections for improvement beyond the valuation date. We are guided in our review and selection of assumptions by the relevant actuarial standards of practice. As a result of our review, we have selected actuarial assumptions we consider to be reasonable and appropriate estimates of future experience for the fund for the long-term future.

1. Investment Return

   7% per year net of investment-related expenses.

2. Inflation

   2.75% per year included in compensation increases and investment return assumptions.

3. Mortality Rates

   PubS-2010 (public safety) total dataset mortality tables for employees and for retirees (sex distinct), projected for mortality improvement generationally using the projection scale MP-2019.

4. Compensation Increases

   General increases of 3% per year combined with promotion, step, and longevity increases that average 2.89% per year over a 30-year career. See Exhibit 12.

5. Retirement Rates

Age	Rate per Year for Firefighters Eligible to Retire
50	30%
51-52	10
53	40
54-55	25
56-59	50
60	100

   The average expected retirement age for paid firefighters not yet eligible to retire based on these rates is 53.6.

6. DROP Elections

   a. Percent of firefighters eligible electing Retroactive DROP: 100% of service retirements eligible to elect at least a 24-month lump sum.

   b. Months assumed for Retroactive DROP lump sum: Maximum they are eligible for, up to 36 months.

   c. Percent of firefighters electing Reverse DROP: 100% of service retirements not eligible to elect at least a 24-month lump sum Retroactive DROP.

   d. Percent of firefighters electing Forward DROP and Combined DROP: 0%

7. Termination Rates

   See Exhibit 12.

8. Disability Rates

   See Exhibit 12.

9. Reduction in Benefit after 2½ Years of Disability Retirement

   15% weighted average reduction in benefit.

10. Percent Married

    90% of the firefighters are assumed to be married at retirement, disability, or death while employed, with male firefighters having a spouse three years younger and female firefighters having a spouse three years older.

11. Payment Form for Retirement Benefits Due to Service Retirement, Disability Retirement, or Vested Termination

    - Joint and 75% to surviving spouse for the 90% assumed to be married
    - Life annuity for the 10% assumed to be single

12. Surviving Child's Death Benefit

    None are assumed as a result of future deaths.

13. Firefighters' Contribution Rate

    14.2% of covered pay.

14. City's Contribution Rate

    24.2% of covered pay for at least as long as the period required to amortize the UAAL.

15. Compensation for First Year Following Valuation Date for Projecting Contributions

The actual (or annualized) pay for 2023 for each firefighter increased by 3% to reflect the general pay increase of 5% effective October 1, 2023. The sum of this compensation for projecting contributions is the covered payroll for the first year following the valuation date.

16. Compensation for First Year Following Valuation Date for Projecting Benefits

Compensation for each firefighter for projecting contributions (described in item 15) decreased by 10% to reflect the exclusion of compensation for unscheduled overtime. This compensation is used for projecting benefits.

17. Administrative Expenses

The expenses paid by fund assets for other than investment-related expenses are assumed to be 1.7% of payroll. The normal cost rate as a percent of payroll is assumed to be 1.7% of payroll higher to reflect these expenses.

18. Conditional 2% Increase in Benefits

The Present Plan's Section F conditional 2% increase in benefits to certain pensions when the fund's investment rate of return averages at least 8.25% over the most recent five consecutive years will never be triggered.

Exhibit 12

Disability and Termination Rates per 1,000 Active Members
Compensation Increases by Years of Service

Disability Rates		Termination Rates		Compensation Increases	
Attained Age	Rate per 1,000	Years of Service	Rate per 1,000	Years of Service	Increase Percent
20	0.14	0	119	1	15.88%
21	0.15	1	107	2	15.88
22	0.16	2	95	3	15.88
23	0.17	3	84	4	6.09
24	0.18	4	73	5	6.09
25	0.19	5	63	6	6.09
26	0.21	6	54	7	6.09
27	0.23	7	48	8	6.09
28	0.25	8	42	9	6.09
29	0.28	9	38	10	6.09
30	0.31	10	33	11	6.09
31	0.35	11	28	12	6.09
32	0.40	12	24	13	6.09
33	0.45	13	21	14	6.09
34	0.49	14	19	15	6.09
35	0.52	15	18	16	6.09
36	0.54	16	18	17	6.09
37	0.57	17	16	18	6.09
38	0.62	18	15	19	6.09
39	0.73	19	15	20	6.09
40	0.92	20 & Over	0	21	3.00
41	1.14			22	3.00
42	1.32			23	3.00
43	1.48			24	3.00
44	1.73			25	3.00
45	2.09			26	3.00
46	2.55			27	3.00
47	2.98			28	3.00
48	3.34			29	3.00
49	3.62			30	3.00
50	3.79			31	3.00
51	3.92			32	3.00
52	4.04			33	3.00
53	4.24			34	3.00
54	4.56			35	3.00
55	0.00			36	3.00
56	0.00			37	3.00
57	0.00			38	3.00
58	0.00			39	3.00
59	0.00			40	3.00

Exhibit 13

Definitions

1. Actuarial Accrued Liability	That portion, as determined by the particular actuarial cost method used, of the Actuarial Present Value of future pension plan benefits as of the Valuation Date that is not provided for by the Actuarial Present Value of future Normal Costs.
2. Actuarial Assumptions	Assumptions as to the occurrence of future events affecting pension costs, such as: mortality, termination, disablement and retirement; changes in compensation; rates of investment earnings and asset appreciation; and other relevant items.
3. Actuarially Equivalent	Of equal Actuarial Present Value, determined as of a given date with each value based on the same set of Actuarial Assumptions.
4. Actuarial Gain (Loss)	A measure of the difference between actual experience and that expected based on the Actuarial Assumptions during the period between two Actuarial Valuation dates, as determined in accordance with the particular actuarial cost method used.
5. Actuarial Present Value	The value of an amount or series of amounts payable or receivable at various times, determined as of a given date (the Valuation Date) by the application of the Actuarial Assumptions.
6. Actuarial Valuation	The determination, as of a Valuation Date, of the Normal Cost, Actuarial Accrued Liability, Actuarial Value of Assets and related Actuarial Present Values for a pension plan.
7. Actuarial Value of Assets	The value of cash, investments and other property belonging to a pension plan, as determined by a method and used by the actuary for the purpose of an Actuarial Valuation.

8. Entry Age Actuarial Cost Method	An actuarial cost method under which the Actuarial Present Value of the Projected Benefits of each individual included in the Actuarial Valuation is allocated as a level percentage of compensation over the period from age at hire to the last age before 100% assumed retirement. The portion of this Actuarial Present Value allocated to a valuation year is called the Normal Cost. The portion of this Actuarial Present Value not provided for at a Valuation Date by the Actuarial Present Value of future Normal Costs is called the Actuarial Accrued Liability. Under this method, Actuarial Gains (Losses), as they occur, reduce (increase) the Unfunded Actuarial Accrued Liability.
9. Plan Year	A 12-month period beginning January 1 and ending December 31.
10. Normal Cost	That portion of the Actuarial Present Value of pension plan benefits that is allocated to a valuation year by the actuarial cost method.
11. Projected Benefits	Those pension plan benefit amounts that are expected to be paid at various future times according to the Actuarial Assumptions, taking into account such items as the effect of advancement in age and past and anticipated future qualified service.
12. Overfunded Actuarial Accrued Liability	The excess, if any, of the Actuarial Value of Assets over the Actuarial Accrued Liability.
13. Unfunded Actuarial Accrued Liability	The excess, if any, of the Actuarial Accrued Liability over the Actuarial Value of Assets.
14. Valuation Date	The date upon which the Normal Cost, Actuarial Accrued Liability and Actuarial Value of Assets are determined. Generally, the Valuation Date will coincide with the end of a Plan Year.
15. Years to Amortize the Unfunded Actuarial Accrued Liability	The period is determined in each Actuarial Valuation as the number of years, beginning with the Valuation Date, to amortize the Unfunded Actuarial Accrued Liability with a level percent of payroll that is the difference between the expected total contribution rate and the Normal Cost contribution rate.

Exhibit 14

Summary of Present Plan

1. Normal Service or Disability Retirement Monthly Benefit	
(a) Percentage of Highest 60-Month Average Salary	75%
(b) Additional amount per year of service over 20 years	$80.00
2. Normal Service Retirement Eligibility (Minimum)	Age 50 and 20 Years or 25 Years and Under 50
3. Supplemental Monthly Benefit	
(a) Monthly amount	$500.00
(b) Eligibility requirement (Minimum)	Age 50 and 20 Years
4. Actuarially Equivalent Early Service Retirement Eligibility	Age 45 and 20 Years
5. Retroactive Deferred Retirement Option Plan (RETRO DROP)	
(a) Earliest RETRO DROP benefit calculation date	Normal Service Retirement Eligibility
(b) Maximum RETRO DROP benefit accumulation period	36 Months
(c) RETRO DROP lump sum includes	
(i) Monthly benefits that would have been received between RETRO DROP benefit calculation date and termination of employment,	
(ii) accumulated contributions made by the firefighter after the RETRO DROP benefit calculation date, and	
(iii) 4% annual interest	
6. Reverse DROP	
(a) Eligible upon attaining Normal Service Retirement Eligibility	
(b) Monthly benefit of 90% of regular benefit	
(c) Lump sum of 24 times the reduced monthly benefit	
(d) No return of accumulated contributions and no interest	

7. Forward DROP	
(a) Earliest Forward DROP irrevocable election	Normal Service Retirement Eligibility
(b) Maximum Forward DROP accumulation period	36 months
(c) Forward DROP lump sum includes	
(i) Monthly benefits that would have been received between the DROP election date and termination of employment,	
(ii) accumulated contributions made by the firefighter after the DROP election date, and	
(iii) 4% annual interest	
8. Vested Terminated Benefit	
(a) Eligibility for firefighters	10 Years
(b) Percent vested with 10 years	50%
(c) Additional percent vested for each year above 10 years	5%
(d) Percent vested with 20 or more years	100%
(e) Benefit is deferred to date person would have satisfied normal service retirement eligibility date	
(f) Benefit is percent vested times service retirement benefit	
9. Disability Retirement Monthly Benefit for Firefighters Who Become Totally Disabled while Employed	
(a) For initial 30-month period is (i) plus (ii) if not able to perform job in fire department	
(i) Minimum monthly amount based on 20 years	
(ii) Additional amount per year of service over 20 years	
(b) Following initial 30-month period is (i), or (ii), or (iii), depending upon status	
(i) Initial benefit	
(ii) Initial benefit multiplied by one-half	
(iii) Zero	
(c) Upon attaining eligibility for normal retirement, the member's vested retirement benefit becomes payable if the disability benefit has been reduced or terminated	
10. Surviving Spouse's Monthly Benefit as a Percentage of Benefit Active Would Have Been Entitled to as a Normal Service Retirement Benefit	75%
11. Surviving Children's Monthly Benefit as a Percentage of Highest 60-Month Average Salary	
(a) Where the spouse is receiving a benefit	11.25%
(b) Where the spouse is not receiving a benefit or there is no spouse	22.50%
12. Contributions as a Percent of Payroll by:	
(a) Firefighters	14.20%
(b) City of Midland	24.20%

13. The normal form of annuity payment at retirement is a Joint and 75% to Surviving Spouse. In lieu of the normal form, an optional reduced Joint and 100% to Surviving Spouse may be elected. Payment is the last day of each month.

14. Salary used to determine the Highest 60-Month Average Salary before January 1, 2024 includes total pay except any lump sum distributions for unused sick leave or vacation are excluded. Beginning January 1, 2024, the salary used also excludes pay for unscheduled overtime. The average is based on the pay for the consecutive 60 months during which the includable pay was highest.

15. Refund of firefighters' accumulated contributions without interest will be made to firefighters who terminate employment and either are not eligible for any other benefit from the fund or request a refund from the fund.

16. Pensioners who have received benefits for five full plan years or more will receive a 2% cost-of-living adjustment on August 1 provided the fund's investment performance over the five plan years ending the previous December 31 averages 8.25% or more. DROP participation does not constitute time credited to the five-year requirement. The $500 per month supplemental benefit will not be increased by the 2% cost-of-living adjustments.

17. A lump sum death benefit of $10,000 will be paid to the designated beneficiary of a deceased firefighter, whether active or inactive (retired firefighter or a vested terminated firefighter).

Appendix A

Review of the Actuarial Economic Assumptions for the December 31, 2023 Actuarial Valuation

Theoretical Investment Return Assumption Development

Asset Class	Gross Annual Real Rate of Investment Return (ROR)[1]	Target Asset Allocation[2]
Domestic Equities		
Large Cap	6.5%	20%
Small/Mid Cap	7.0	5
		25
International Equities	7.0	15
Fixed Income	2.0	15
Alternatives		
Venture Capital/Private Equity	8.5	15
Real Estate	5.5	10
Master Limited Partnerships	8.0	10
Private Credit	5.0	5
		40
Cash	0.0	5
Total		100%
Weighted Average Gross Real ROR Assumption		5.88%
Weighted Average Net Real ROR Assumption[3]		4.63%
Possible Theoretical Annual Investment Return Assumption: Net Real ROR Plus Assumed Annual Rate of Inflation		
Assumed 2.75% Inflation		7.38%

[1] A gross **real** rate of return is an assumed total annual rate of investment return, before expenses, that is in excess of the assumed annual inflation rate. These are long-term assumptions made by Rudd and Wisdom, Inc.

[2] This allocation is based on the new investment consultant's asset allocation target.

[3] A weighted average Net Real ROR is an annual rate equal to the weighted average Gross Real ROR reduced by investment-related expenses of an assumed annual rate of 1.25%. Before the change to the new investment consultant, investment-related expenses had been averaging 1.25% of assets. In the future, these expenses should be somewhat lower, but the large allocation to alternatives suggests the level could still be above 1.00%.

Appendix A (continued)

Price Inflation in the USA - Average Annual Rates of Increase in the CPI-U

Years (Dec. to Dec.)	Number of Years	Average Annual Increase
1958 – 2023	65	3.70%
1963 – 2023	60	3.90
1968 – 2023	55	4.00
1973 – 2023	50	3.86
1978 – 2023	45	3.41
1983 – 2023	40	2.81
1988 – 2023	35	2.71
1993 – 2023	30	2.51
1998 – 2023	25	2.54
2003 – 2023	20	2.58

Most inflation forecasts are for 10 years or less. For example, the average 10-year forecast in the December 2023 Livingston Survey published by the Federal Reserve Bank of Philadelphia was 2.26%. However, 10 years is too short a forecast period for a public employee defined benefit pension plan. In the 2024 annual report of the OASDI Trust Funds (Social Security), the ultimate inflation assumptions for their 75-year projections are 3.0%, 2.4%, and 1.8% for the low-cost, intermediate, and high-cost assumptions, respectively. Looking at the average annual increase in the CPI-U over historical periods of 30 to 65 years above and considering the Social Security forecasts, we believe that reasonable assumed rates of inflation for the long-term future would range from 2.25% to 3.00%.

Administrative Expenses Paid by the Fund

Plan Year Ending 12/31 (1)	Administrative Expenses Paid by the Fund (2)	Covered Payroll (3)	% of Payroll (2) ÷ (3) (4)
2023	$ 400,000(estimated)	$ 25,136,197	1.59%
2022	388,777	23,428,042	1.66
2021	406,490	22,103,901	1.84
2020	330,045	20,196,734	1.63
2019	390,407	19,403,712	2.01
2018	230,738	17,568,234	1.31
2018-2023	$2,146,457	$127,836,820	1.68%

The administrative expenses are not reflected in the investment return assumption but are reflected as a percent of payroll that is added to the normal cost contribution rate. We recommend 1.70%, the average developed above for the last six plan years, rounded up to a multiple of 0.05%. (The covered payroll was determined as the contributions by the firefighters or the city for the plan year divided by the appropriate contribution rate during the plan year.) This is the same as the 1.70% assumption for the prior valuation.

Appendix A (continued)

Comparison of 12/31/2021 Actuarial Economic Assumptions with 12/31/2023 Actuarial Economic Assumptions

Actuarial Assumption[1]	12/31/2021 Actuarial Economic Assumptions	12/31/2023 Actuarial Economic Assumptions
Inflation (Price)	2.75%	2.75%
Net real rate of return[2]	4.25	4.25
Net total investment return[2]	7.00%	7.00%
Firefighter pay increase[3]	5.89%	5.89%
Aggregate payroll increase	3.00%	3.00%
Administrative expenses	1.70% of payroll	1.70% of payroll

[1] All assumptions are annual rates.
[2] Net of all investment-related expenses.
[3] For both 12/31/2021 and 12/31/2023, a 3% annual general compensation increase combined with annual promotion, step, and longevity pay increases that vary by length of service, which together average 5.89% over a 30-year career.

Appendix B

Other Disclosures as of December 31, 2023

Negative Amortization

- As of this actuarial valuation, the fund has perpetual negative amortization because the total contributions are inadequate to pay the normal cost and to amortize the unfunded actuarial accrued liability.

Reasonable Actuarially Determined Contribution Rate

- The benchmark actuarially determined contribution (ADC) rate in the section on funding policy on page 5 is a reasonable ADC rate consistent with actuarial standards of practice.

Actuarial Valuation Software

- We have utilized software licensed from Winklevoss Technologies, LLC in the development of the liabilities summarized in the report. We have independently confirmed the model developed by Winklevoss and have sufficiently tested it to ensure the model is an accurate representation of the system's liabilities.

Low-Default-Risk Obligation Measure (LDROM)

- The LDROM is a new required disclosure calculated as of the date of the actuarial valuation using a discount rate based on high quality bond yields instead of the expected return on the fund's diversified investment portfolio.

Low-Default-Risk Obligation Measure	$346,804,053
Actuarial Accrued Liability	$212,410,475

- The difference between the LDROM and the actuarial accrued liability determined in this actuarial valuation could be viewed as the expected savings from investing in the fund's diversified portfolio instead investing only in high quality bonds.

- For our calculation of the LDROM, we have used the same actuarial cost method and actuarial assumptions from this actuarial valuation summarized in Exhibits 11 and 12, except for an assumed discount rate of 3.26% instead of the investment return assumption of 7%. To determine the assumed discount rate, we used the Bond Buyer Index of general obligation bonds with 20 years to maturity, which has an average rating roughly equivalent to Moody's Investors Services' Aa2 rating and Standard and Poor's Corporation AA. The weekly index closest to the December 31, 2023 measurement date was 3.26%.

- Because the fund's assets are not invested only in high-quality bonds, the LDROM does not reflect the fund's actuarial condition, nor does it offer insights into the total contribution required for an adequate contribution arrangement or the security of participant benefits.