CHEIRON

Classic Values, Innovative Advice

**Austin Firefighters
Retirement Fund**

**Actuarial Valuation Report
as of December 31, 2022**

Produced by Cheiron

July 2023

TABLE OF CONTENTS

Via Electronic Mail

July 18, 2023

Board of Trustees
Austin Firefighters Retirement Fund
4101 Parkstone Heights Drive, Suite 270
Austin, Texas 78746

Dear Trustees of the Board,

We are pleased to submit the December 31, 2022 Actuarial Valuation Report of the Austin Firefighters Retirement Fund ("Fund"). This report contains information on Fund assets, liabilities, and contributions. Financial disclosures are provided in a separate Governmental Accounting Standards Board (GASB) Statement Nos. 67/68 report.

In preparing our report, we relied on information, some oral and some written, supplied by the Fund's staff. This information includes, but is not limited to, plan provisions, member data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23, Data Quality.

The actuarial assumptions reflect our understanding of the likely future experience of the Fund and represent our best estimate, in cooperation with the views of the Board of Trustees (Board), for the future experience of the Fund. These assumptions are based on the most recent experience study dated April 21, 2020 based on data through December 31, 2019, which was performed by the previous actuary, with a few exceptions that are noted in Appendix C. The liability and contributions developed in this report rely on future Fund experience conforming to the underlying assumptions. Future results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law.

This report and its contents have been prepared in accordance with generally recognized and accepted actuarial principles and practices and our understanding of the Code of Professional Conduct and applicable Actuarial Standards of Practice, set out by the Actuarial Standards Board as well as applicable laws and regulations, including Texas pension statutes. Furthermore, as credentialed actuaries, we meet the Qualification Standards of the American Academy of Actuaries to render the opinion contained in this report. This report does not address any contractual or legal issues. We are not attorneys, and our firm does not provide any legal services or advice.

This actuarial valuation report was prepared exclusively for the Austin Firefighters Retirement Fund and the Fund auditors for the purposes described herein and in preparing financial reports in accordance with applicable law and annual report requirements. Other users of this report are not intended users as defined in the Actuarial Standards of Practice, and Cheiron assumes no duty or liability to such other users.

Sincerely,
Cheiron

Elizabeth Wiley, FSA, EA, MAAA, FCA
Consulting Actuary

Heath Merlak, FSA, EA, MAAA, FCA
Principal Consulting Actuary

Coralie Taylor, FSA, EA, MAAA, FCA
Consulting Actuary

FOREWORD

Cheiron is pleased to provide the annual actuarial valuation report of the **Austin Firefighters Retirement Fund (Fund)** as of December 31, 2022. The purpose of this report is to:

1) **Measure and disclose**, as of the valuation date, the financial condition of the Fund.

2) **Report** on past and expected financial trends.

3) **Determine** the funding period required to amortize any existing Unfunded Actuarial Liability (UAL).

4) **Assess** risks to the Fund's financial condition.

An actuarial valuation establishes and analyzes Fund assets and liabilities on a consistent basis and traces the progress of both from one year to the next. It includes measurement of the Fund's investment performance as well as an analysis of actuarial liability gains and losses. This valuation report is organized as follows:

Section I presents a summary of the valuation and compares this year's results to last year's results.

Section II identifies the primary risks to the Fund as well as provides background information and assessment of these risks.

Section III contains exhibits relating to the valuation of assets.

Section IV shows the various measures of liabilities and presents an analysis of the experience gains and losses over the past year and the source of changes to the UAL.

Section V shows the development of the Actuarially Determined Contribution Benchmark.

The appendices to this report contain a summary of the Fund's membership at the valuation date, a summary of the major provisions of the Fund, and the actuarial methods and assumptions used in developing the valuation.

In preparing our report, we relied on information, some oral and some written, supplied by the Fund's staff. This information includes, but is not limited to, the plan provisions, employee data, and financial information. We performed an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23, Data Quality.

The actuarial assumptions reflect our understanding of the likely future experience of the Fund, and the assumptions entirely represent our best estimate for the future experience of the Fund. These assumptions are based on the most recent experience study dated April 21, 2020 based on data through December 31, 2019, which was performed by the previous actuary, with a few exceptions that are noted in Appendix C. Based on an informal review, this is a reasonable basis appropriate for use in this valuation. Future results may differ significantly from the current results presented in this report due to such factors as the following: plan experience differing from that anticipated by the assumptions; changes in assumptions; and changes in plan provisions or applicable law.

SECTION I – SUMMARY

General Comments

This is the first actuarial valuation report prepared for the Fund by Cheiron. The results prior to December 31, 2022 in the historic trend charts are those produced by the Fund's former actuary.

The employer and member contributions to this Fund are set by Vernon's Texas Civil Statute, Article 6243e.1. An Actuarially Determined Contribution Benchmark is provided in this report for comparison to the current contribution rates based on the Funding Policy adopted by the Board as of December 16, 2019. In addition, this report also provides a tread water contribution rate, which represents the contribution level required to cover the cost of benefits accruing during the year and interest on the Unfunded Actuarial Liability (UAL), and thus anticipated to keep the UAL at the same dollar amount if all assumptions are exactly met.

The key results of the December 31, 2022 actuarial valuation are as follows:

- The unfunded actuarial liability (UAL) on an actuarial value of assets (AVA) basis [actuarial liability (AL) – AVA] increased from $136.3 million as of December 31, 2021 to $183.4 million on December 31, 2022.
  - Investments earned -11.6% on a market value basis for the year ending December 31, 2022, resulting in an investment loss on the market value of assets (MVA) of $242.6 million. Due to smoothing of investment gains and losses, the AVA return was 6.3%, producing a loss of $11.2 million to the Fund for the year on that basis. Both returns are measured against the prior year's 7.30% expected return.
  - The Fund experienced a liability loss of $21.8 million. The liability loss is primarily due to data changes and valuation coding refinements.
  - The actuarial liability also increased by $16.0 million due to assumption changes effective December 31, 2022. The assumptions related to mortality, Deferred Retirement Option Plan (DROP) elections, and recognizing previously granted COLAs for actives in DROP were updated.
  - A more detailed analysis of the current year and historical changes in the unfunded actuarial liability can be found in Sections II and IV of this report.

- The Fund's AVA funded ratio, the ratio of the AVA to the actuarial liability, decreased from 89.6% as of December 31, 2021 to 86.9% as of December 31, 2022. On a MVA basis, the funded ratio decreased from 99.3% as of December 31, 2021 to 80.0% as of December 31, 2022.

SECTION I – SUMMARY

The tables below provide a summary of the actuarial valuation. The prior year valuation results are shown for comparison purposes as well as a column looking at the change in each value as a percentage of the prior year's values. Note results prior to December 31, 2022 are from the Fund's prior actuary.

Table I-1 Austin Firefighters Retirement Fund Summary of Principal Results			
	December 31, 2022	December 31, 2021	% Change
Assets and Liabilities			
Actuarial Liability (AL)	$ 1,394,695,732	$ 1,313,297,933	6.2%
Actuarial Value of Assets (AVA)	1,211,321,297	1,176,967,709	2.9%
Unfunded Actuarial Liability (UAL)	$ 183,374,435	$ 136,330,224	34.5%
Funded Ratio (AVA basis)	86.9%	89.6%	(2.8%)
Market Value of Assets (MVA)	$ 1,115,832,870	$ 1,303,544,505	(14.4%)
Funded Ratio (MVA basis)	80.0%	99.3%	(19.3%)
Amortization Period	35.7	17.5	104.0%
Statutory Contribution Rates			
City Contribution Rate	22.05%	22.05%	0.0%
Member Contribution Rate	18.70%	18.70%	0.0%
Total Contribution Rate	40.75%	40.75%	0.0%
Current Normal Cost as % of Payroll	30.73%	29.61%	3.8%
Contribution Rate Remaining to Pay UAL	10.02%	11.14%	(10.1%)
City Rate Based on ADC Benchmark	22.76%	18.71%	21.7%
City Rate Surplus/(Deficit) Compared			
to ADC Benchmark	(0.71%)	3.34%	(121.3%)
Treadwater City Contribution Rate	25.19%	20.93%	20.4%
City Rate Surplus/(Deficit) Compared			
to Treadwater Rate	(3.14%)	1.12%	(380.3%)
Participant Information			
Actives	1,199	1,175	2.0%
Service Retirees, including DROP	793	756	4.9%
Beneficiaries	171	152	12.5%
Disability Retirees	15	16	(6.3%)
Terminated Vested	35	29	20.7%
Total Participants	2,213	2,128	4.0%
Covered Payroll	$ 105,372,248	$ 102,887,082	2.4%

SECTION I – SUMMARY

Historical Trends

It is important to take a step back from these latest results and view them in the context of the Fund's recent history. Below we present a series of charts displaying key factors in the valuations since 2013.

Assets and Liabilities
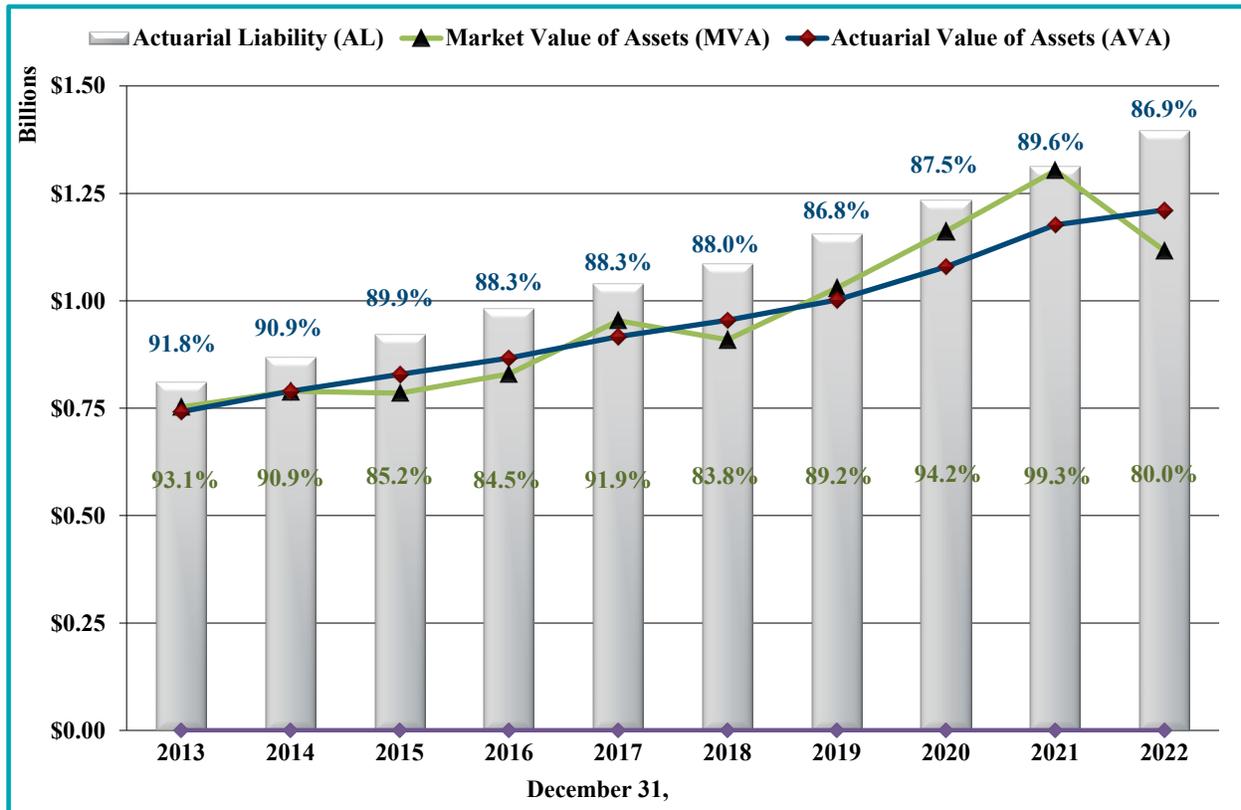
The bars represent the actuarial liability (AL) as measured for funding purposes in the valuations. The lines represent the Fund's assets, with the green line showing the market value of assets (MVA) that is reported in the Fund's financials and the blue line showing the smoothed actuarial value of assets (AVA). The liabilities are compared to the assets to develop funding ratios as of each valuation date. The ratio of the AL to the AVA is the AVA funded ratio, which are the blue percentages shown in the chart along the top of each bar. Similarly, the ratio of the AL to the MVA is the MVA funded ratio, the green percentages shown on the bars.

As shown, the Fund has had an AVA funded ratio of 86% or higher during this period with the highest funded ratio in 2013 at 91.8%. The MVA funded ratio has been more variable, reflecting the market volatility, from a high of 99.3% as of 2021 to a low of the current 80.0%.
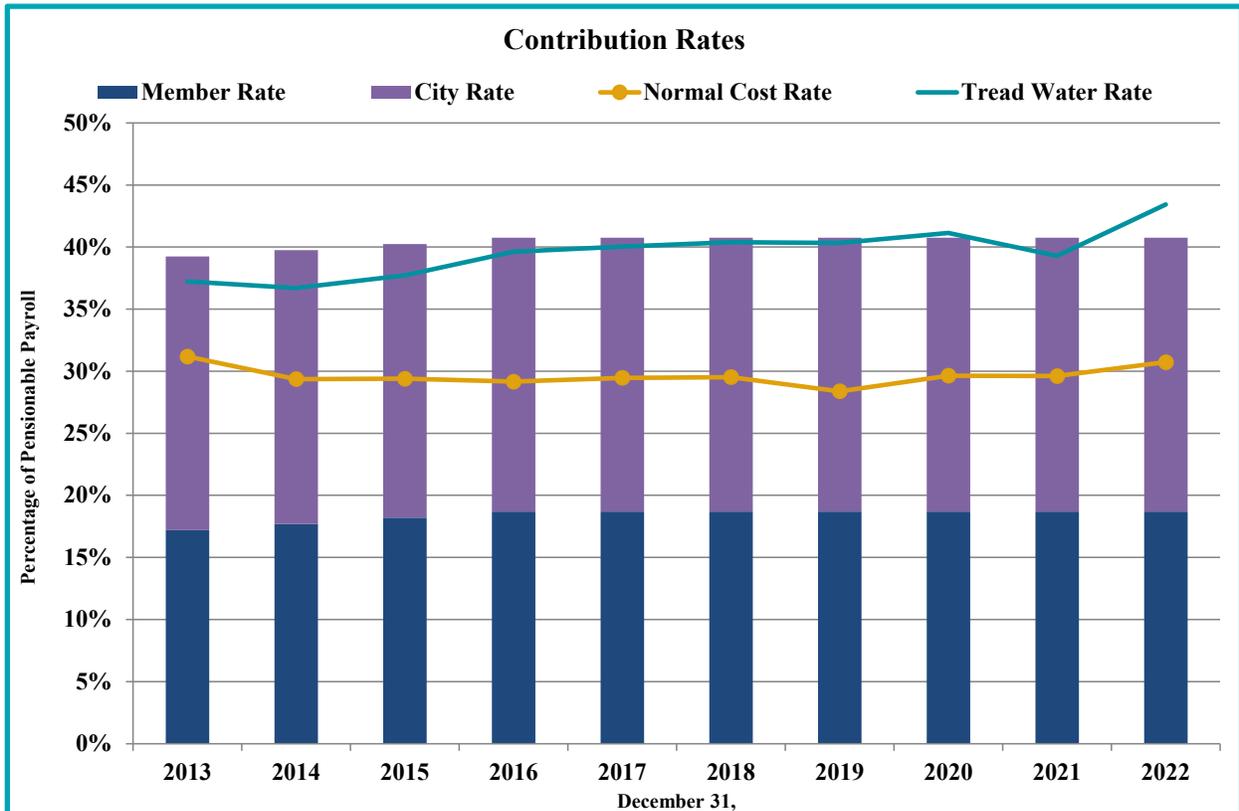
SECTION I – SUMMARY

Contributions versus Tread Water

The next chart compares the fixed city and member contribution rates, shown by the bars, to the normal cost rate and the tread water rate as of each valuation date. The normal cost rate, the orange line, is the percentage of salary needed to fund the benefits earned in a year for the active members. The tread water rate, the teal line, is that rate of payroll which, if contributed, would result in the UAL remaining the same in the following year if all experience exactly matched the assumptions. The tread water rate is equal to the normal cost rate plus interest on the UAL.

As shown below, the fixed total contributions exceed the normal cost rate for all years shown. The difference between the tops of the bars and the orange line represents the portion of contributions that are available to fund the UAL. The chart also shows that the normal cost rate has been relatively stable over this period, staying within approximately one percentage point of 30%.

As shown with the stacked bars, the sum of the fixed contribution rates for the city and members has been greater than the tread water rate over this period except for two years (2020 and 2022). With the 2022 asset loss, the tread water rate is higher than the fixed contribution rates and is expected to increase as the 2022 asset loss is reflected in future valuations.

SECTION I – SUMMARY

Amortization Periods

The chart below shows the effective amortization period for funding the UAL based on the Actuarial Value of Assets as of each valuation date since the Fund began performing annual actuarial valuations in 2013. Due to leveraging, the amortization period can vary significantly from year to year.

The Pension Review Board (PRB) provides funding guidelines for public pensions in Texas, including that the contributions actually received by funds should be sufficient to pay the normal cost each year as well as amortize the fund's UAL over a period not to exceed 30 years and with 10-25 years being the preferred range. While the Fund's amortization period as of the current valuation of 35.7 years is greater than the guideline recommended maximum of 30 years, this amortization period does not trigger a Funding Soundness Restoration Plan (FSRP) for the current year. Based on the legislation for FSRPs that is currently in effect, the Fund and the City of Austin would be required to formulate an FSRP if the Fund's amortization period exceeds 30 years for three consecutive annual valuations.
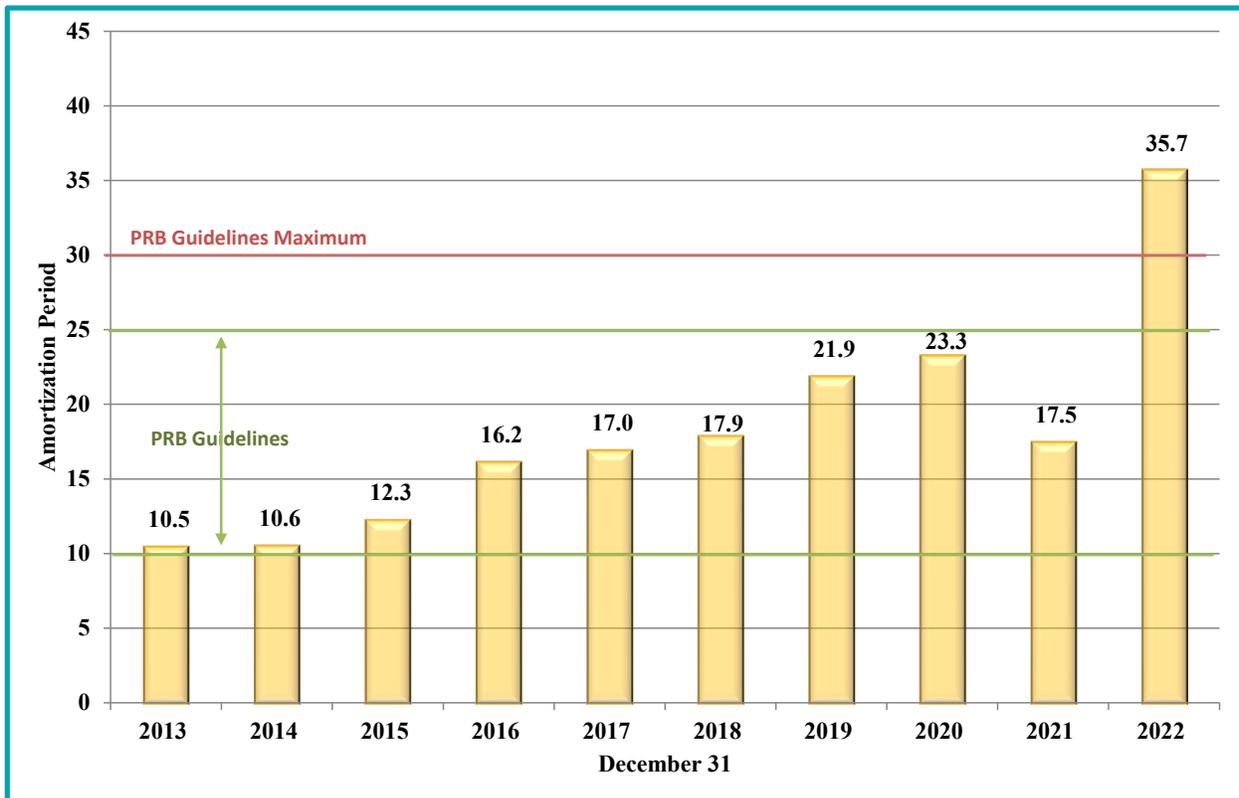
While an FSRP is not currently triggered, it is important to note that in baseline projections where all assumptions are exactly met, as shown on page 8, it is anticipated that an FSRP will be triggered with the 2024 valuation unless the Fund experiences a significant gain, such as returns significantly exceeding the 7.3% assumed rate, in the next two years.
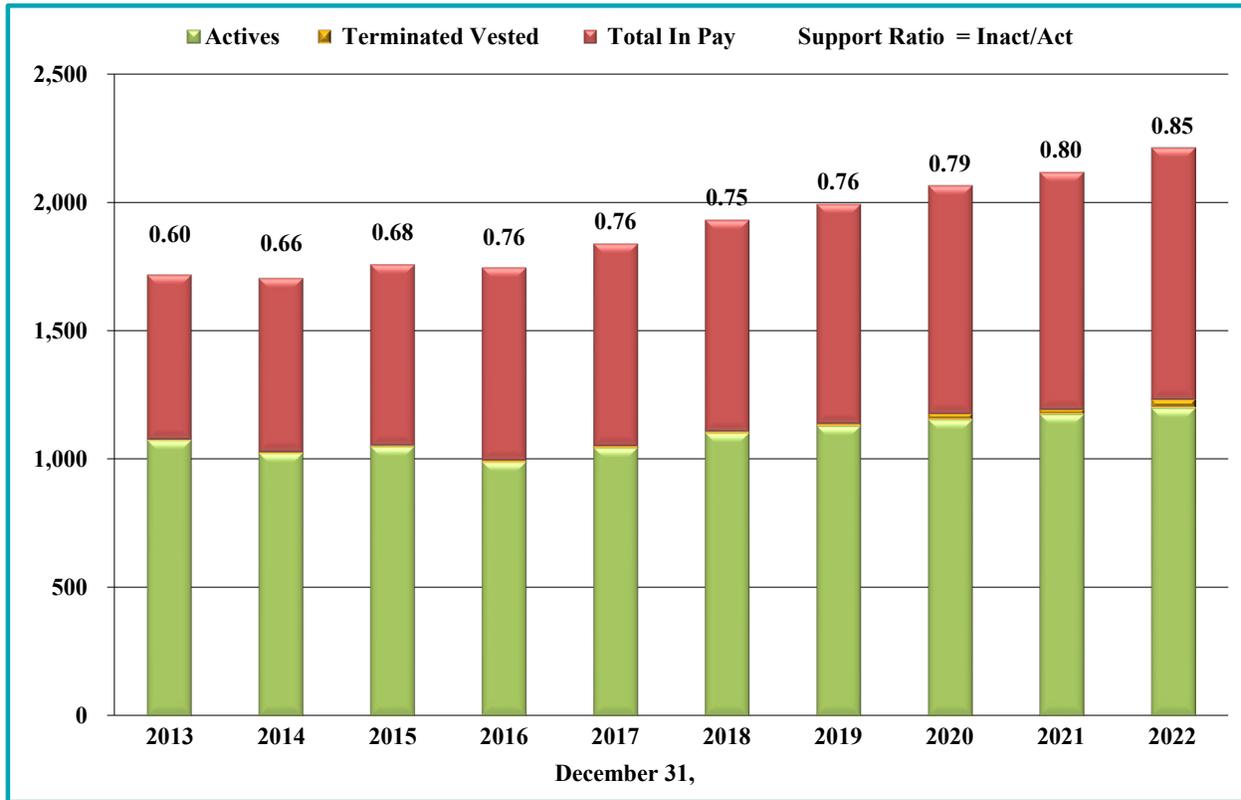
SECTION I – SUMMARY

Member Trends

The following chart shows the membership counts of the Fund at successive valuations. The numbers that appear above each bar represent the ratio of the number of inactive members, those currently receiving benefits (red bars) and terminated vested members (yellow bars), to active members (green bars) as of each valuation date, referred to as the support ratio.

The number of inactives per each active has generally been steadily increasing during the period shown. An increasing ratio is a sign of plan maturity and should continue to be monitored. As a plan becomes more mature, the assets backing the retiree benefits become large relative to the contribution base, i.e., the active member payroll. As assets grow relative to the pensionable payroll, any experience gain or loss can have an increasingly significant impact on the actuarial valuation results. This maturity risk is discussed further in Section II of this report.

SECTION I – SUMMARY

Projections

The chart that follows shows the expected progress of the Fund's funding status over the next 20 years, measured in terms of the AVA funded ratio, the expected total contribution rates, and the total dollar amounts of contributions.

This baseline projection is based on the December 31, 2022 valuation, including the 7.30% rate of return assumption. It is important to note that the Fund's actual experience will not conform exactly to the assumptions every year. As a result, in addition to the baseline projection of 7.30% investment returns, we provide additional projections, or stress testing, in Section II based on varying returns in the future, as variation in this assumption is typically the most significant driver of variation in valuation results.

The projections, both the baseline in this section and the varying returns in Section II, assume there will be no future gains or losses on the liability, and that the Fund receives the statutory contribution rates (18.70% for members and 22.05% for City) each year. As such, these projections assume all valuation assumptions are exactly met, including the long-term rates of return specified and assumed for each scenario and the covered payroll increasing by 2.50% per year in all scenarios.

For each projection, there is a table of assumed asset returns for each of the projection and two charts showing the projected condition of the Fund based on returns equal to those shown in the table assuming all other assumptions are exactly met.

This first chart compares the market value of assets (MVA) (blue line) and the actuarial or smoothed value of assets (AVA) (green line) to the Fund's actuarial liabilities (AL) (gray bars). In addition, at the top of each chart, we show the Fund's AVA funded ratio (ratio of AVA to AL). The years shown in the chart signify the valuation date as of December 31 of each labeled year.
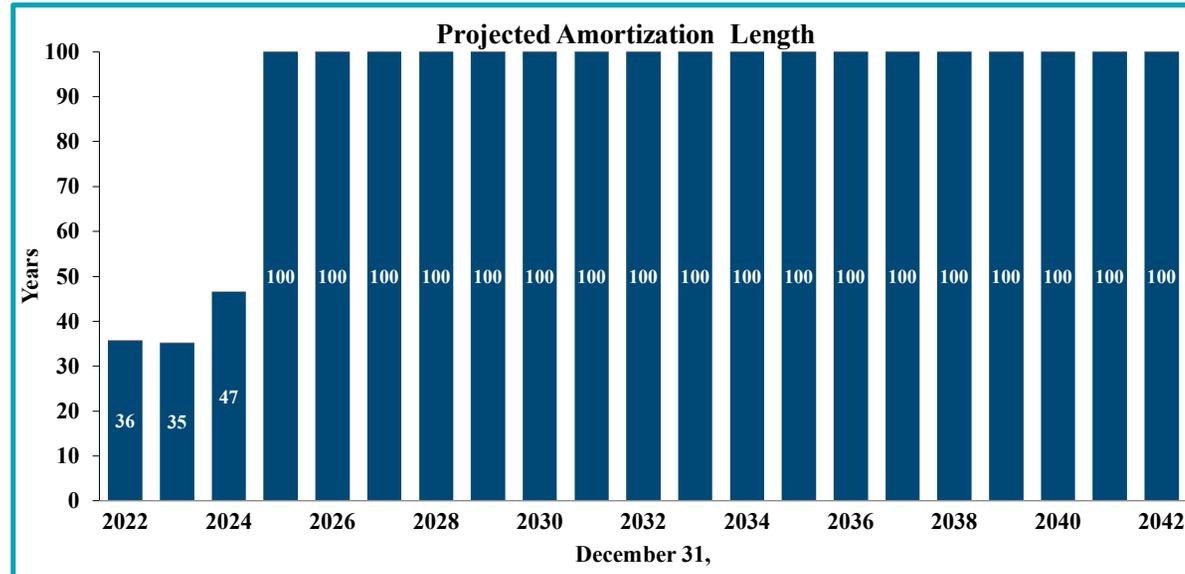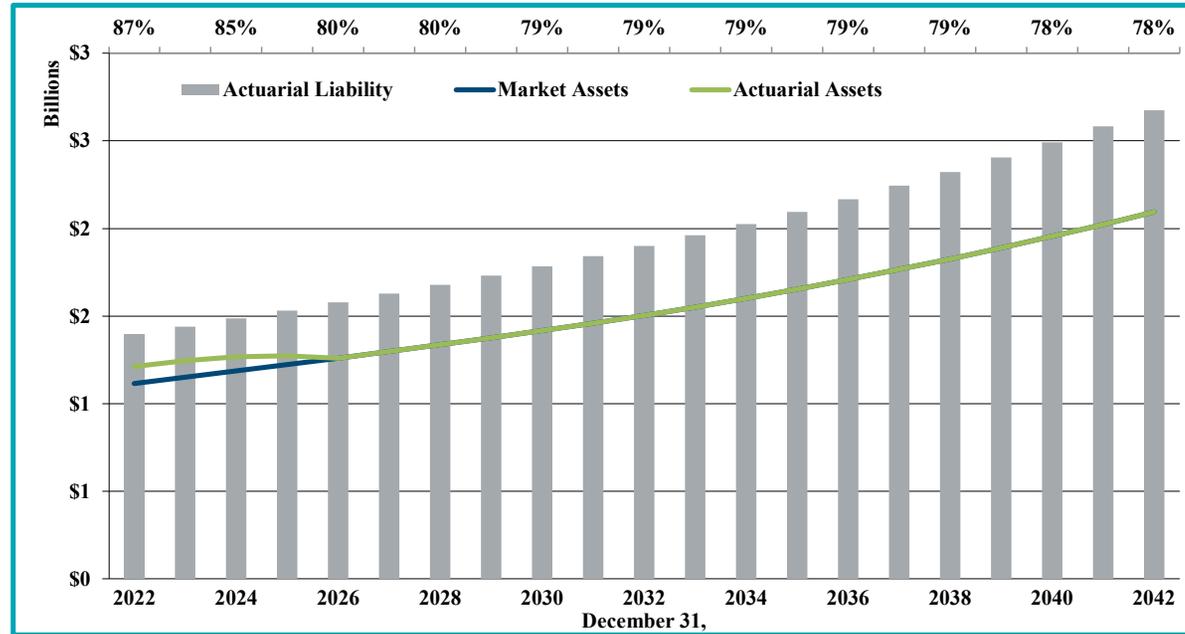
The second chart provides the effective amortization period based on the statutory contributions of 18.70% of pay for active members and 22.05% of pay for the City. When the bars expand to 100 years that indicates the City and member contributions are not expected to be sufficient to pay down the UAL. This occurs when the amount of contribution available to amortize the UAL is not sufficient to cover the interest on the UAL.

The baseline chart below shows that if all actuarial assumptions, including the current 7.3% rate of investment return assumption, are exactly met, the Fund's AVA funded ratio, shown along the top of the chart, is projected to decrease from the current level of 87% to 78% by the 2042 valuation. The AVA funded ratio is expected to decrease in the near-term as the 2022 asset loss is recognized in the valuation. Once the 2022 asset loss is fully recognized, the funded ratio is expected to decrease slightly throughout the projection period due to anticipated contributions being less than the tread water contributions. Over this projection period, the effective amortization period increases to 100 years, reflecting the full recognition of the 2022 asset loss. Section II explores further how these metrics can vary when returns deviate from the expected 7.3%.

SECTION I – SUMMARY

Projected Asset Returns	
2023	7.30%
2024	7.30%
2025	7.30%
2026	7.30%
2027	7.30%
2028	7.30%
2029	7.30%
2030	7.30%
2031	7.30%
2032	7.30%
2033	7.30%
2034	7.30%
2035	7.30%
2036	7.30%
2037	7.30%
2038	7.30%
2039	7.30%
2040	7.30%
2041	7.30%
2042	7.30%

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Actuarial valuations are dependent on assumptions about future economic and demographic experience. Based on actuarial standards of practice, these assumptions represent a reasonable estimate of future experience. However, actual future experience will never conform exactly to the assumptions and may differ significantly. This deviation is the risk that pension plan sponsors undertake in relying on a pension plan's actuarial valuation results.

This section of the report is intended to identify the primary drivers of these risks to the Fund, provide background information and assessments about these risks and drivers, and communicate the significance of these risks to the Fund and its sponsors.

Identification of Risks

As we have discussed with the Board, the fundamental risk to the Fund is that the contributions needed to pay the desired benefits become insufficient. While there are many factors that could lead to current contribution rates becoming insufficient, we believe the primary risks are:

- Investment risk
- Interest rate risk
- Longevity and other demographic risks
- Assumption change risk
- Plan change risk

Other risks that we have not identified may also turn out to be important.

Investment Risk is the potential for investment returns to deviate from what is expected. When actual investment returns are lower than the investment return assumption used in the actuarial valuation, the unfunded actuarial liability will increase from what was expected and will require higher contributions than otherwise anticipated. But when actual returns exceed the assumption, the resulting unfunded liability measurements and actuarially determined contributions will be lower than anticipated. The potential volatility of future investment returns is determined by the Fund's asset allocation and the affordability of the investment risk is determined by the amount of assets invested relative to the size of the plan sponsor or other contribution base. As seen in the historical section that follows, this risk has been a very significant driver of deviations in the actual measurements for this Fund from those expected by the prior valuations.

Interest Rate Risk is the potential for interest rates to be different than expected. For public plans, short-term fluctuations in interest rates have little or no effect as the Fund's liability is usually measured based on the expected return on assets. Longer-term trends in interest rates, however, can have a powerful effect.

Longevity and Other Demographic Risks is the potential for mortality or other demographic experience to be different than expected. Generally, longevity and other demographic risks emerge slowly over time as the actual experience deviates from expected. In addition, the extensive number of assumptions related to longevity and other demographic experience often

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

result in offsetting factors contributing to the Fund's overall liability experience. As such, these risks are often dwarfed by other risks, particularly those due to investment returns. The historical section shows that this has been true for this Fund, with the total of the liability gains and losses only being about $4 million over the period of 2013-2022.

Assumption Change Risk is the potential for the environment to change such that future valuation assumptions are adjusted to be different than the current assumptions. For example, declines in interest rates over time due to economic factors may result in a change in the assumed investment rates of return used in the valuations. In terms of demographic factors, a healthier workforce may result in changes in employee behavior such that retirement rates are adjusted to reflect employees working longer. In addition, mortality rates are adjusted to account for members living longer and receiving more years of their retirement benefits. Assumption change risk is an extension of the risks previously identified, but rather than capturing the risk as it is experienced, it captures the cost of recognizing a change in environment resulting in the current assumption no longer being reasonable.

Plan Change Risk represents the possibility of legislated changes made to the statutes governing the Fund. This includes any changes to the benefits paid by the Fund or the contributions that must be paid by the city and the members to the Fund. Over the history of this Fund, these changes have included granting cost-of-living adjustments (COLAs), which increase the benefits paid to members designed to provide purchasing power protection from inflation, changes to the multipliers and minimums used to determine the amount of member benefits, and changes to the contributions that must be paid by the city and members. As shown on the chart on the following page, plan changes have been a significant driver of liability changes for the Fund over the last ten years.

Based on the Board's communicated intent, the most likely plan changes in the future are additional COLAs. It is important to note that the Fund's policies, which require the Fund to meet certain funding conditions before plan changes can be granted, provide protection from this risk.

The chart below shows the components of changes in the Unfunded Actuarial Liability (UAL) for the Fund over the last ten years, including investment gains and losses on the Actuarial Value of Assets, liability gains and losses, assumption and method changes, and the paying down of the UAL. Amounts below the horizontal axis are gains, or decreases to the UAL, while amounts above the axis are losses, or increases to the UAL. The net UAL change is shown by the dark blue line.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Historical Changes in UAL 2013-2022
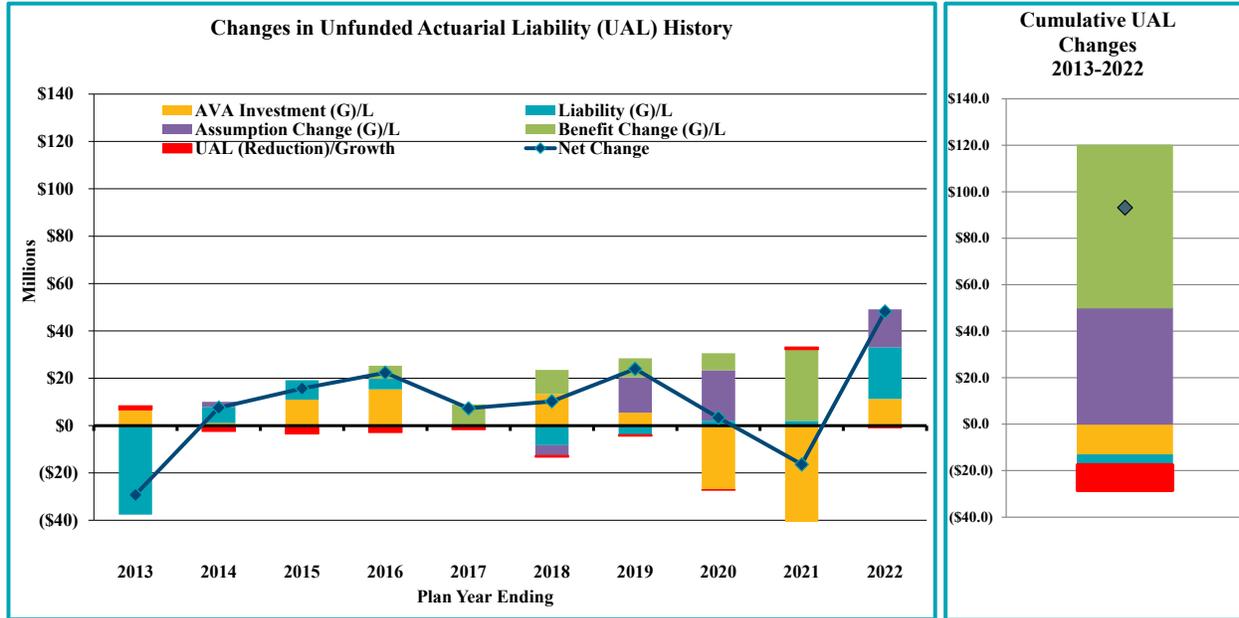
On a smoothed asset basis, the investment gains and losses (gold bars) from 2013 to 2022 reflect investment losses on a smoothed or AVA basis in seven of the 10 years shown. However, two of these years, 2020 and 2021, had significant gains such that over the 10-year period, in aggregate, investment losses and gains decreased the UAL by approximately $13 million. While the aggregate amount is relatively small, it is important to note that this is the largest driver of changes in the UAL for the majority of individual years in the period shown.

On the liability side (teal bars), the Fund has experienced a net liability experience gain that reduced the UAL by approximately $4 million over this period. Assumption and method changes (purple bars) have increased the UAL by approximately $50 million over the 10-year period. The assumption changes have included lowering the discount rate from 7.75% to 7.30%, updating the mortality assumptions and other demographic assumptions, and the changes implemented with this valuation and the change in actuary.

Benefit changes noted by the green bar reflect the increase in liability for COLAs granted in the last ten years. Over this period, the granted COLAs have added $70 million to the UAL.

Finally, each year the UAL is expected to decrease/(increase) as the total contributions received by the Fund exceed/(are less than) the contributions needed to pay the normal cost, for the benefits earned in the current year. In aggregate, the contributions received by the Fund in excess of normal cost, have decreased the UAL by approximately $9 million over the last 10 years. Note that these amounts are all below the x-axis, meaning the contributions were sufficient to reduce the UAL, except for 2013 and 2021. In these years, the contributions were not sufficient to cover the interest on the existing UAL, thus increasing the UAL. In the case of 2021, this corresponds

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

with the previous notation in Section I that in the 2020 valuation, which assesses the contributions for 2021, the total fixed contributions were less than the tread water contribution rate. Since the tread water contribution rate as of this December 31, 2022 valuation is also above the total fixed contribution, it is anticipated that the UAL paid amount for the 2023 plan year will also be above the x-axis since the actual contributions will be insufficient to amortize, or pay down, any portion of the existing UAL.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Plan Maturity Measures

The future financial condition of a mature pension plan is more sensitive to each of the risks identified above than a less mature plan. Before assessing each of these risks, it is important to understand the maturity of this Fund compared to other plans and how the maturity has changed over time.

Plan maturity can be measured in a variety of ways, but they all get at one basic dynamic – the larger the plan is compared to the contribution or revenue base that supports it, the more sensitive the plan will be to risk. The measures below have been selected as the most important in understanding the primary risks identified for this Fund.

Inactives per Active (Support Ratio)

One simple measure of plan maturity is the ratio of the number of inactive members, those currently receiving benefits and terminated vested members, to the number of active members. The revenue base supporting the plan is usually proportional to the number of active members, so a relatively high number of inactives compared to actives indicates a larger plan relative to its revenue base as well.

The Boston College's Center for Retirement Research, the National Association of State Retirement Administrators (NASRA), MissionSquare, and the Government Finance Officers Association (GFOA) maintain the Public Plan Database that contains the majority of state plans (119) as well as many (101) large municipal plans, covering over 95% of the membership in public plans as well as over 95% of the assets held by public pension plans.

The chart that follows shows the support ratio for all plans in this database since 2013. The colored bars represent the central 90% of the support ratios for the plans in the database. The Austin Firefighters Retirement Fund is represented by the gold diamonds.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Support Ratio

*Survey Data from Public Plans Data as of 4/12/2023*
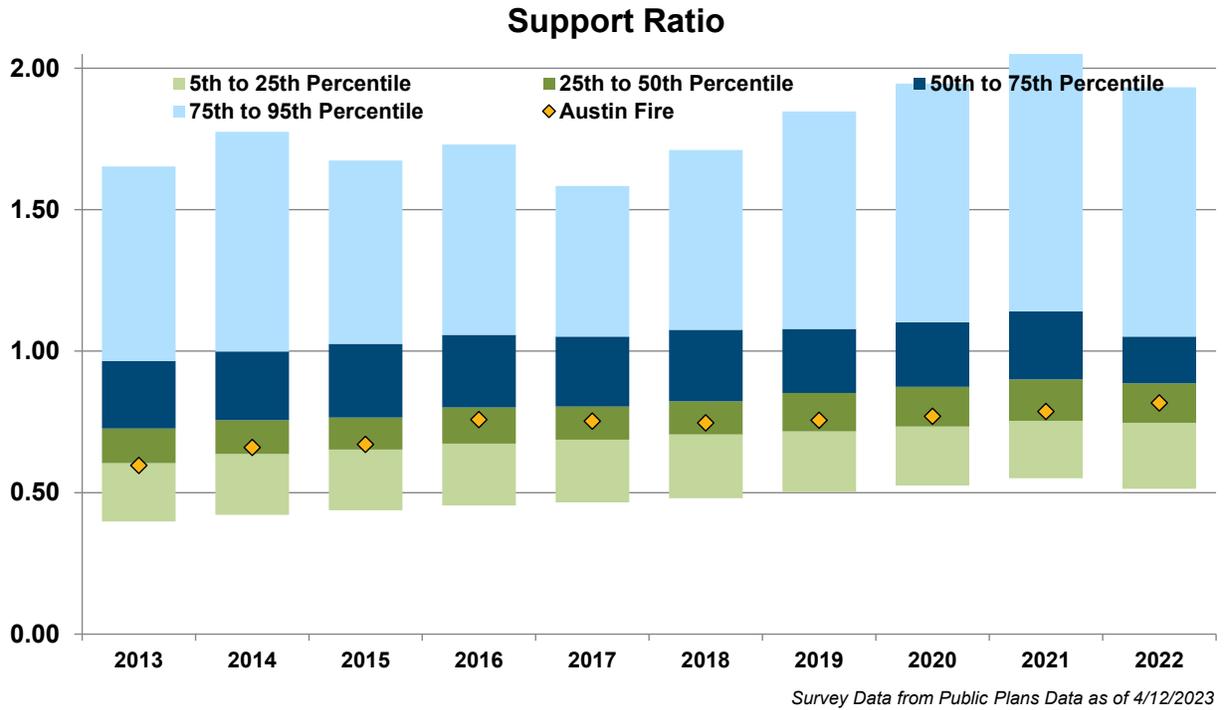
This chart shows that the Fund is not as mature as other plans in this database. The support ratios for the universe of public plans shown have increased over the period as they mature, with the Fund's support ratio generally increasing at a similar pace. The Fund has remained below the 50th percentile for the entire period.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Net Cash Flow

The net cash flow of the plan as a percentage of the beginning of year assets indicates the sensitivity of the plan to short-term investment returns. Net cash flow is equal to contributions less benefit payments and administrative expenses. Mature plans can have large amounts of benefit payments compared to contributions, particularly if they are well funded. Investment losses in the short-term are compounded by the net withdrawal from the plan leaving a smaller asset base to try to recover from the investment losses. Large negative cash flows can also create liquidity issues.


Net Cash Flow Rate

Survey Data from Public Plans Data as of 4/12/2023
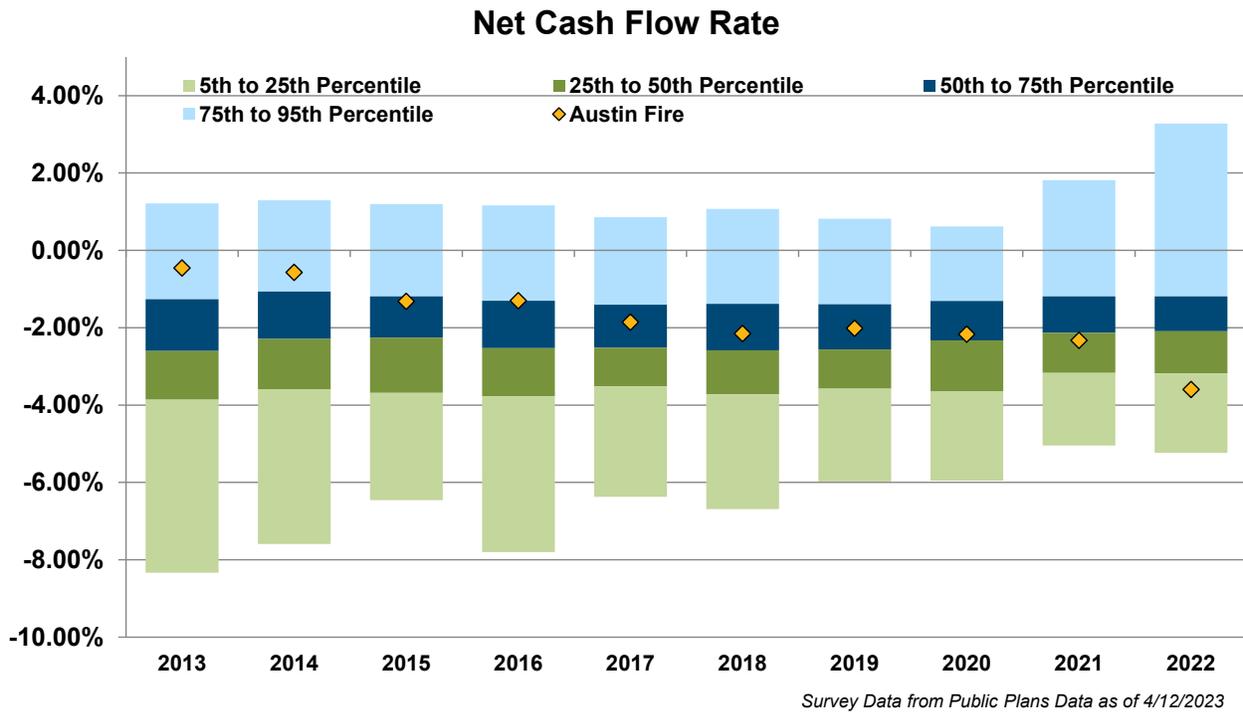
The chart above shows the distribution of net cash flow as a percent of assets, again with the bars showing the 5th to 95th percentile for the plans in the Public Plans Database. The gold diamonds show the Fund's experience for this metric as well, allowing comparison to the other plans. Up until 2020, the Fund was generally consistently above the 50th percentile. However, in 2021, the Fund's cash flow as a percent of assets decreased putting the Fund in the 25th to 50th percentile. The decrease in this percentage is primarily due to the plan maturing and the timing of the measurement. The Fund uses a measurement date of December 31, 2022 so the 2022 calendar returns are fully reflected whereas most of the universe uses measurement dates during the calendar year so only reflecting a portion of the 2022 calendar year returns.

Additionally, as DROP payments increase relative to the size of the Fund, these will likely create additional volatility in this measurement from year-to-year. The chart below shows the percentage of assets that are attributable to DROP balances since this information was first reported with the 2015 valuation.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK
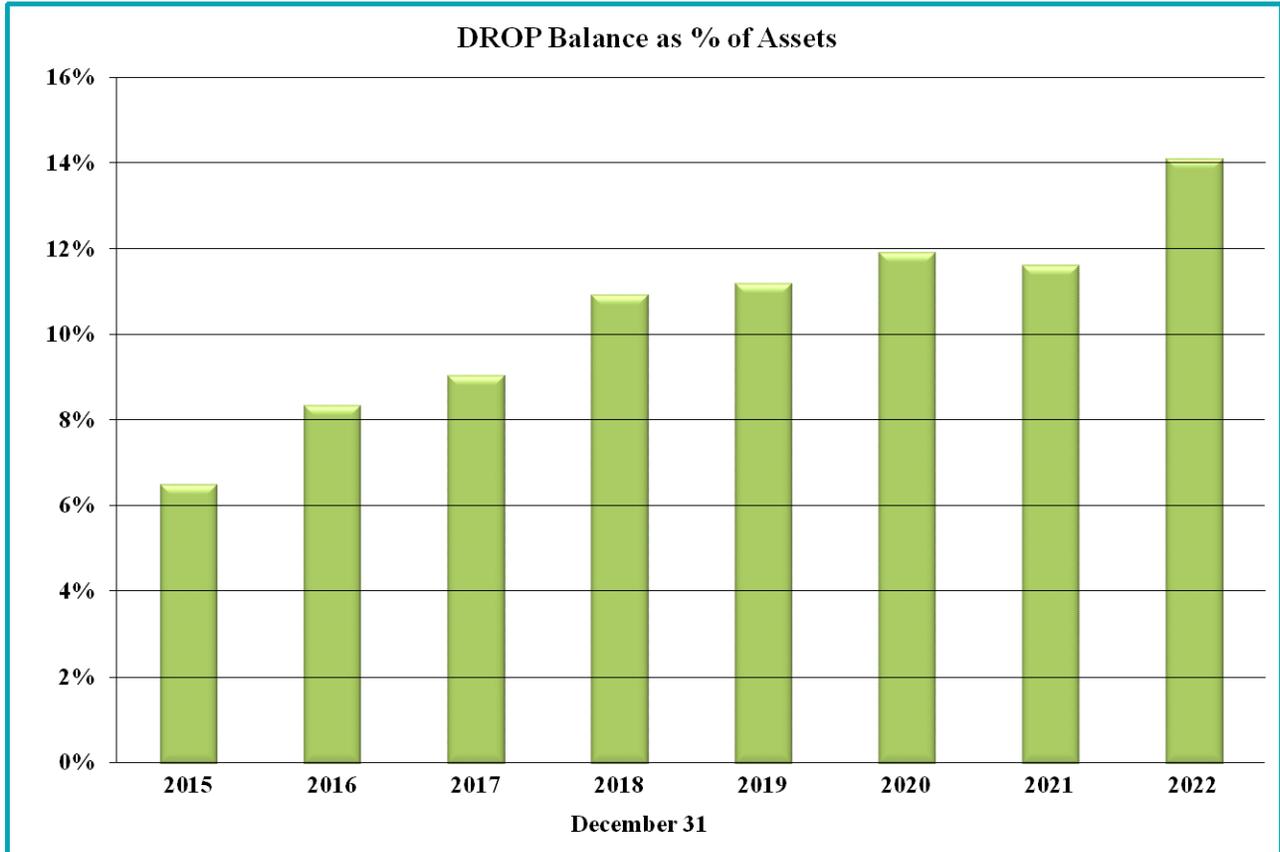
This graph is provided because it is important that the Fund's assets be invested considering the liquidity needs of paying out DROP accounts to members. This is a specific risk applicable to this Fund due to the structure of the benefits provided.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Deterministic Scenarios/Stress Testing

We developed several hypothetical scenarios to illustrate the impact that deviations from the assumed investment returns may have on future funded ratios and amortization periods. The scenarios presented are illustrative and intentionally balanced between positive and negative scenarios. They are intended to illustrate the importance of both the return itself as well as the timing of such returns.

The charts on the following pages show the projections under each of these theoretical scenarios:

- Asset returns that are 1% higher than the expected return of 7.3% annually
- Asset returns that are 1% lower than the expected return of 7.3% annually
- Asset return for 2023 that is 10% higher than the expected return of 7.3% and then equal to the expected 7.3% for each year thereafter
- Asset return for 2023 that is 10% lower than the expected return of 7.3% and then equal to the expected 7.3% for each year thereafter
- Asset returns that vary from year to year based on market conditions observed beginning in the year ending January 1, 2004. The compounded return over this period is 7.4% and demonstrates the importance of the timing of returns.

The projection charts shown have the same format as those included for the baseline scenario in the prior section. The top projection chart compares the market value of assets (MVA) (gold line) and the actuarial or smoothed value of assets (AVA) (blue line) to the Plan's actuarial liabilities (AL) (gray bars). In addition, at the top of each chart, we show the Plan's AVA funded ratio (ratio of AVA to AL). The second chart provides the effective amortization period based on the statutory contributions of 18.70% of pay for members and 22.05% of pay for the City and all assumptions being exactly met, including the asset returns specified for each scenario.

In addition to showing the variability of valuation results with different returns, these scenarios highlight how volatile the amortization period metric is to returns.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Fund Earns 8.3% for Each Year Over the Projection Period

Projected Asset Returns	
2023	8.30%
2024	8.30%
2025	8.30%
2026	8.30%
2027	8.30%
2028	8.30%
2029	8.30%
2030	8.30%
2031	8.30%
2032	8.30%
2033	8.30%
2034	8.30%
2035	8.30%
2036	8.30%
2037	8.30%
2038	8.30%
2039	8.30%
2040	8.30%
2041	8.30%
2042	8.30%
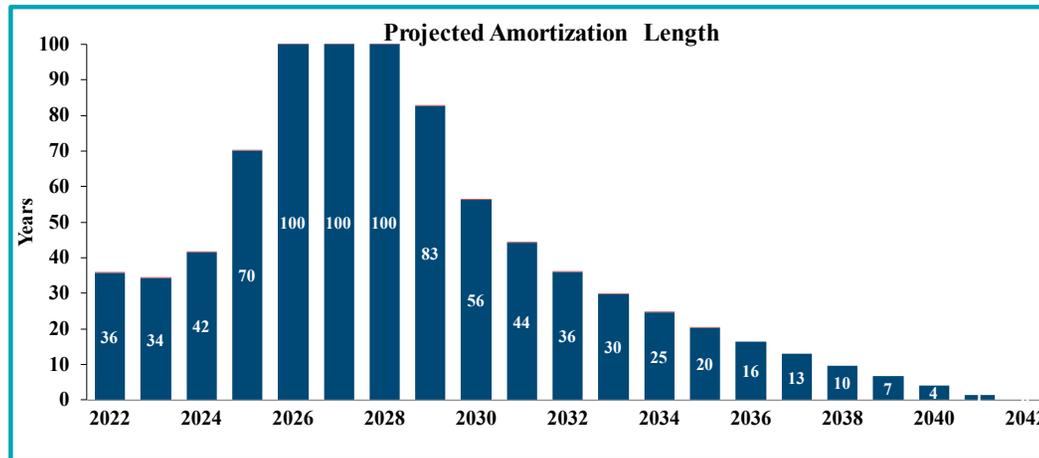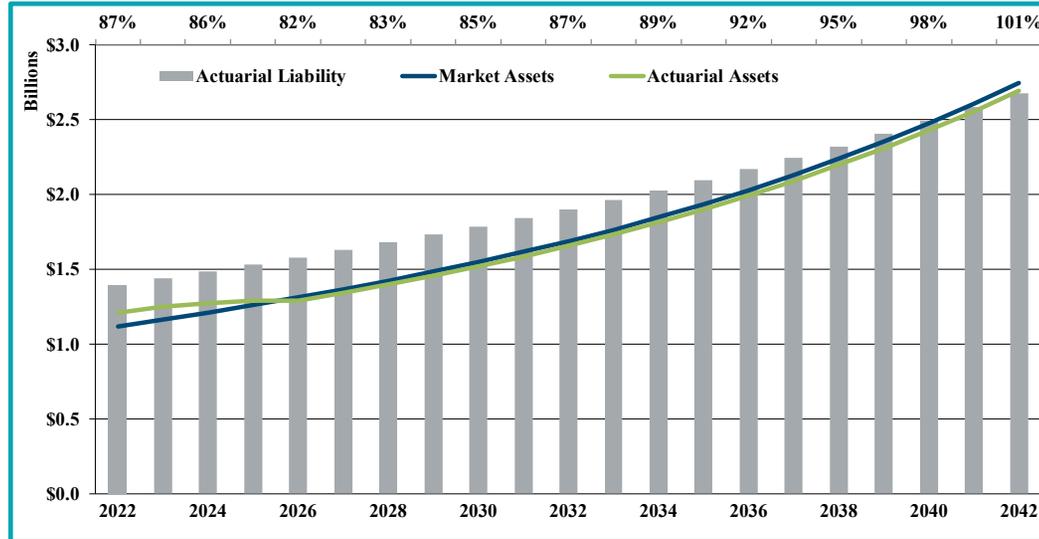
Under this scenario, the Fund reaches full funding by the end of the projection period. The amortization length is expected to exceed 30 years from 2022 until 2032 without any changes to funding.

18

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Fund Earns 6.3% for Each Year Over the Projection

Projected Asset Returns	
2023	6.30%
2024	6.30%
2025	6.30%
2026	6.30%
2027	6.30%
2028	6.30%
2029	6.30%
2030	6.30%
2031	6.30%
2032	6.30%
2033	6.30%
2034	6.30%
2035	6.30%
2036	6.30%
2037	6.30%
2038	6.30%
2039	6.30%
2040	6.30%
2041	6.30%
2042	6.30%
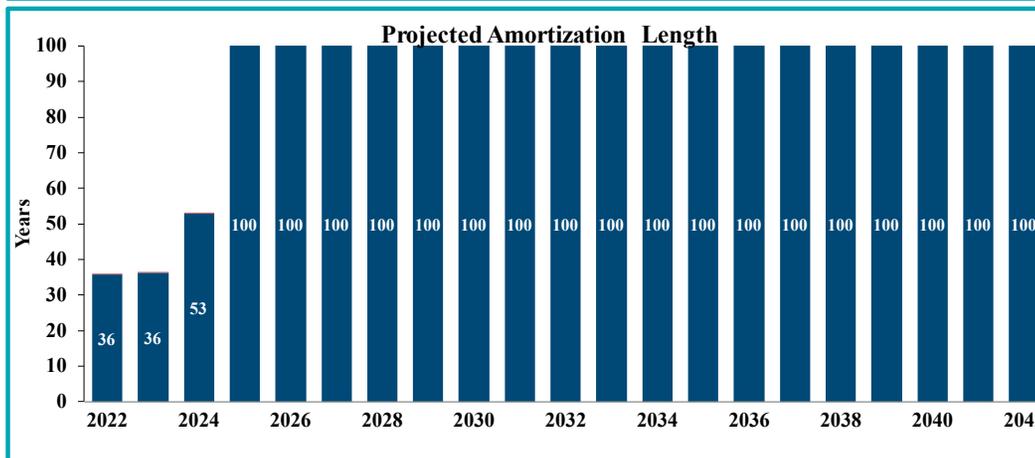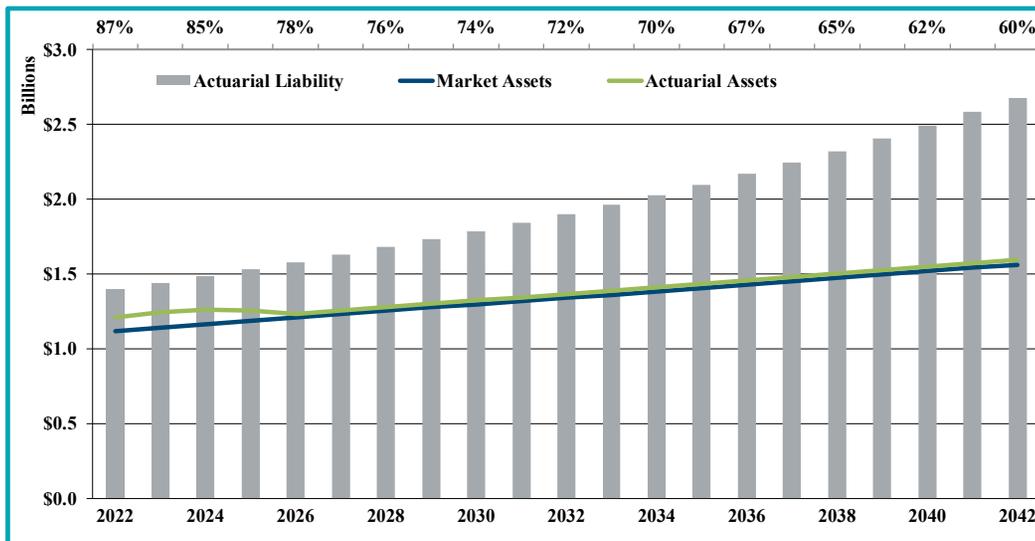
Under this scenario, the amortization period is expected to exceed 30 years in all years with the UAL never being expected to be amortized beginning with 2025, the same as is seen in the baseline scenario. At the end of the 20-year period, the AVA funded ratio is expected to be 60%, less than the 78% in the baseline scenario.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Fund Earns 17.3% for 2023 (10% above the expected return), then 7.3% per year each year thereafter

Projected Asset Returns	
2023	17.30%
2024	7.30%
2025	7.30%
2026	7.30%
2027	7.30%
2028	7.30%
2029	7.30%
2030	7.30%
2031	7.30%
2032	7.30%
2033	7.30%
2034	7.30%
2035	7.30%
2036	7.30%
2037	7.30%
2038	7.30%
2039	7.30%
2040	7.30%
2041	7.30%
2042	7.30%

Under this scenario, the Fund reaches an AVA funded ratio of 94% at the end of the 20-year period, above the 78% of the baseline scenario, and the amortization length is only expected to exceed 30 years during 2022 and 2026. And in all years the UAL is expected to be amortized in this scenario.

20

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Fund Earns -2.7% for 2023 (10% below the expected return), then 7.3% per year each year thereafter

Projected Asset Returns	
2023	-2.70%
2024	7.30%
2025	7.30%
2026	7.30%
2027	7.30%
2028	7.30%
2029	7.30%
2030	7.30%
2031	7.30%
2032	7.30%
2033	7.30%
2034	7.30%
2035	7.30%
2036	7.30%
2037	7.30%
2038	7.30%
2039	7.30%
2040	7.30%
2041	7.30%
2042	7.30%

Under this scenario, the Fund never reaches full funding and at the end of the projection period the AVA funded ratio is expected to be 63%, less than the 78% of the baseline scenario. Additionally, the amortization length is expected to exceed 30 years for all years of the projection period, with there being no expectation of the UAL being fully amortized beginning in 2024.

SECTION II – IDENTIFICATION AND ASSESSMENT OF RISK

Fund asset returns vary from year to year based on market conditions beginning with the year 2004

Projected Asset Returns	
2023	10.88%
2024	4.91%
2025	15.79%
2026	5.49%
2027	-37.00%
2028	26.46%
2029	15.11%
2030	2.11%
2031	16.00%
2032	32.39%
2033	13.69%
2034	1.38%
2035	11.96%
2036	21.83%
2037	-4.38%
2038	31.49%
2039	18.40%
2040	28.69%
2041	-18.14%
2042	7.30%
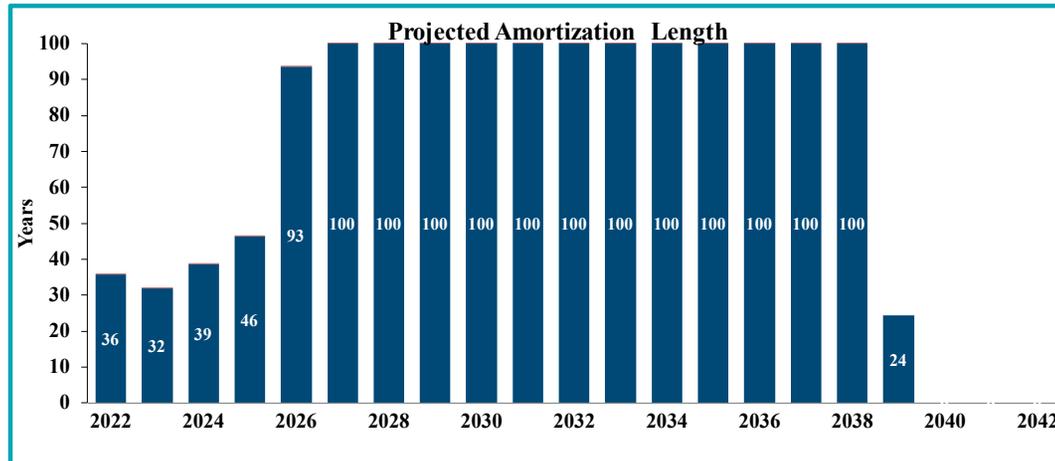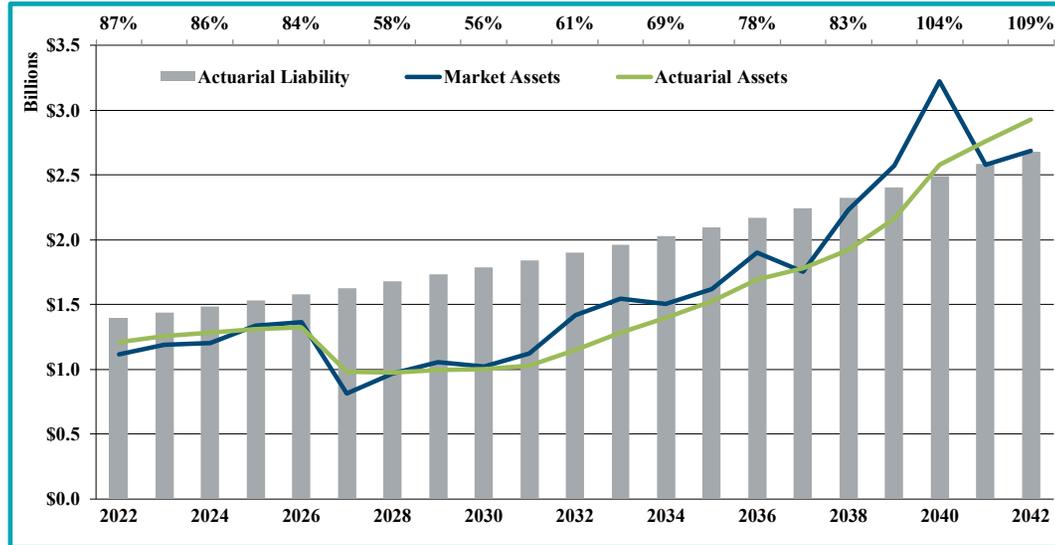
Under this scenario, the Fund reaches full funding during 2040 and the amortization length is expected to exceed 30 years through 2038 until high returns in 2038 drop the amortization period to 24 years for 2039 followed by anticipation of there being no UAL beginning with 2040.

SECTION III – ASSETS

Assets play a key role in the financial operation of the Fund and in the decisions that the Board of Trustees may make with respect to future deployment of those assets. The level of assets, the allocation of assets among asset classes, and the methodology used to measure assets will likely impact upon benefit levels, employer contributions, and the ultimate security of members' benefits.

In this section, we present detailed information on the Fund's assets including:

- Disclosure of the Fund's assets as of December 31, 2022
- Statement of the changes in market values during the year
- Development of the actuarial value of assets
- A comparison of the year's investment performance to the return assumption

Disclosure

The market values of assets represent "snap-shot" or "cash-out" values, which provide the principal basis for measuring financial performance from one year to the next. However, market values can fluctuate widely with corresponding swings in the marketplace. As a result, smoothed market values are usually used in reviewing a Fund's financial condition.

The actuarial value of assets are based on market values that have smoothed in investment gains and losses. Current methods employed by this Fund set the actuarial value equal to the market value, adjusted for a five-year phase-in of investment experience gains and losses.

SECTION III – ASSETS

The assets below are based upon audited financial data furnished by the Fund's staff. The components of the market value of assets as of the current and immediately prior valuation year as well as the change in these categories and the total market value of assets during the valuation year ending December 31, 2022 is summarized below.

Table III-1 Statement of Market Value of Assets as of December 31,				
	2022		**2021**	**% Change**
Assets				
Cash & Short-Term Investments	$ 7,245,787	$	23,333,740	(68.95%)
Receivables	164,116		1,027,301	(84.02%)
Fixed Income	310,744,525		355,108,683	(12.49%)
Domestic Equities	219,699,040		255,991,895	(14.18%)
International Equities	209,977,146		265,520,653	(20.92%)
Real Estate	112,168,625		105,885,100	5.93%
Natural Resources	33,428,837		33,391,511	0.11%
Private Equities	222,733,907		264,312,984	(15.73%)
Total Assets	$ **1,116,161,983**	$	**1,304,571,867**	(14.44%)
Liabilities				
Securities Purchased and Other Investment Liabilities	$ 0	$	1,027,362	(100.00%)
Accrued Expenses and Other Liabilities	329,113		0	0.00%
Total Liabilities	$ **329,113**	$	**1,027,362**	(67.97%)
Market Value of Assets	$ **1,115,832,870**	$	**1,303,544,505**	85.60%

Numbers may not add due to rounding

SECTION III – ASSETS

The chart below shows the calculation of the investment gain/loss. On a market value basis, the Fund earned a -11.59% return, a total investment loss of $ 148.8 million during 2022, resulting in a net Fund asset loss on a market value of assets basis of $ 242.6 million. On an actuarial value of assets basis, the Fund had a higher return for the year, 6.33%, but still below the 7.30% return assumed in the prior year's valuation, producing a loss of $ 11.2 million to the Fund on that basis.

	Market Value of Assets	Actuarial Value of Assets
Table III-2		
Changes in Value of Assets		
1. **Value of Assets - December 31, 2021**	$ 1,303,544,505	$ 1,176,967,709
2. Calculation of Net Cash Flow		
(a) Member Contributions	$ 19,306,629	$ 19,306,629
(b) Employer Contributions	22,765,290	22,765,290
(c) Benefit Payments and Refunds	(80,970,089)	(80,970,089)
(d) **Net Cash Flow**	$ (38,898,170)	$ (38,898,170)
3. **Value of Assets - December 31, 2022**	$ 1,115,832,870	$ 1,211,321,297
4. Net Investment Income [3. - 1. - 2.(d)]	$ (148,813,465)	$ 73,251,758
5. Average Value of Assets [1. + 1/2 x 2.(d)]	$ 1,284,095,420	$ 1,157,518,624
6. Rate of Return [4. / 5.]	-11.59%	6.33%
7. Assumed Rate of Return	7.30%	7.30%
8. Expected Net Investment Income	$ 93,763,972	$ 84,498,860
9. Investment Gain/(Loss) [4. - 8.]	$ (242,577,437)	$ (11,247,102)

SECTION III – ASSETS

The next table shows how the actuarial value of assets is developed. The actuarial value of assets represents a "smoothed" value developed by the actuary to reduce, or eliminate, erratic results that could develop from short-term fluctuations in the market value of assets.

The actuarial value of assets for the Fund is based on the market value of assets adjusted by a five-year smoothing of gains and losses on a market value basis. However, if the actuarial value of assets is less than 80% or more than 120% of the market value, an adjustment is made to the actuarial value to bring the value within this corridor. Additional details regarding this methodology are included in Appendix C of the report.

Table III-3		
Development of Actuarial Value of Assets		
	Original Gain/(Loss)	**Deferred Portion**
Defer 0% of 2018 Loss	$ (98,535,264)	$ 0
Defer 20% of 2019 Gain	71,447,637	14,289,527
Defer 40% of 2020 Gain	79,891,968	31,956,787
Defer 60% of 2021 Gain	87,212,015	52,327,209
Defer 80% of 2022 Loss	(242,577,437)	(194,061,950)
Total Deferred Gain/(Loss) for AVA Calculation		$ (95,488,427)
Market Value of Assets at December 31, 2022		$ 1,115,832,870
Total Unrecognized Gain/(Loss)		(95,488,427)
Actuarial Value of Assets at December 31, 2022		$ 1,211,321,297
Actuarial Value as a Percent of Market Value		108.6%

SECTION III – ASSETS

The final table in this section summarizes the annual returns on both a market and actuarial value of assets value for the last ten years as well as provides averages over the last five and ten years for these two metrics.

Table III-4 Historic Investment Return		
Year Ending December 31,	**Market Value**	**Actuarial Value**
2022	-11.6%	6.3%
2021	14.9%	12.0%
2020	15.4%	10.2%
2019	15.7%	7.1%
2018	-2.7%	6.2%
2017	17.1%	7.8%
2016	7.0%	5.8%
2015	0.7%	6.3%
2014	5.5%	7.6%
2013	14.9%	8.1%
Average Returns		
Last 5 years:	5.7%	8.3%
Last 10 years:	7.3%	7.7%

SECTION IV – LIABILITIES AND EXPERIENCE GAINS/(LOSSES)

In this section, we provide detailed information related to the Fund's liability measurements, including:

- Disclosure of the Fund's liabilities;
- Development of the experience gains and losses from liabilities; and
- Detailed development of the sources of the liability gains and losses during the year.

The table that follows presents the present value of future benefits and the actuarial liabilities by membership status for the current and immediately preceding valuations. It also includes the normal cost for both of these valuations, as a dollar amount and as a percentage of the total pensionable payroll.

Table IV-1 Present Value of Future Benefits (PVFB) Detail and Liability Allocations		December 31, 2022		December 31, 2021
Present Value of Future Benefits (PVFB)				
Active Member Benefits	$	885,237,218	$	822,868,771
Service Retirees, including DROP		795,346,099		762,133,987
Beneficiaries		55,477,984		46,008,096
Disability Retirees		7,256,265		7,426,188
Terminated Vested		5,039,375		3,668,501
Total Present Value of Future Benefits	$	**1,748,356,941**	$	**1,642,105,543**
Actuarial Liability				
Active Member Benefits	$	531,576,009	$	494,061,161
Service Retirees, including DROP		795,346,099		762,133,987
Beneficiaries		55,477,984		46,008,096
Disability Retirees		7,256,265		7,426,188
Terminated Vested		5,039,375		3,668,501
Total Actuarial Liability (AL)	$	**1,394,695,732**	$	**1,313,297,933**
Normal Cost	$	**31,261,216**	$	**29,387,903**
Normal Cost as a % of Pensionable Payroll		**30.73%**		**29.61%**

SECTION IV – LIABILITIES AND EXPERIENCE GAINS/(LOSSES)

The table below presents the changes in actuarial liability during the plan year. In general, the actuarial liability of any retirement Fund is expected to change at each subsequent valuation for a variety of reasons. In each valuation, we report on those elements of the change in the liabilities that are of particular significance, potentially affecting the long-term financial outlook of the Fund. The first table provides a summary of the expected liability and actual liability as of December 31, 2022. The second table provides more details on the liability (gain)/loss for the year.

Table IV-2	
Changes in Actuarial Liability	
Actuarial Liability as of December 31, 2021	$ 1,313,297,933
Normal Cost	29,387,903
Benefit Payments	(80,970,089)
Interest	95,112,711
Assumption Changes	16,041,970
Benefit Changes	0
Expected Actuarial Liability as of December 31, 2022	$ 1,372,870,428
Actual Actuarial Liability as of December 31, 2022	$ 1,394,695,732
Actuarial Liability (Gain)/Loss	$ 21,825,304

Table IV-3	
Actuarial Liability (Gain)/Loss by Source as of December 31, 2022	
Salary/Service Increase	$ (7,988,904)
Retirement Experience	634,435
Retiree Mortality	148,494
Change in Actuary	13,284,846
Data Updates	12,108,622
Other Experience	3,637,811
Experience (Gain)/Loss	$ 21,825,304

SECTION V – ACTUARIALLY DETERMINED CONTRIBUTION BENCHMARK

Actuarially Determined Contribution Benchmark

Since the City and members each contribute to the Fund at a fixed rate as outlined in Vernon's Texas Civil Statute, Article 6243e.1, the Board developed an Actuarially Determined Contribution (ADC) benchmark for comparative purposes in the Fund's Funding Policy dated December 16, 2019. This ADC benchmark is developed using the actuarial assumptions and methods identical to those disclosed in this report, except as follows:

Amortization Period — The ADC benchmark is determined in conjunction with each annual actuarial valuation by determining the fixed-rate contribution rates that would result in a 30-year amortization period as of the valuation date. Note for informational purposes, a 20-year amortization period is provided as well.

Payroll Growth Assumption – The ADC benchmark will be calculated using a payroll growth assumption that is the lesser of 3.0% and the average payroll growth of the Austin Fire Department over the last ten (10) years. Since an actuarial valuation was not completed for December 31, 2012, a 9-year annual average of payroll growth from December 31, 2013 was used for the current year and determined to be 2.56%. This 2.56% was thus used to determine the ADC benchmark as defined by the Funding Policy as of December 31, 2022.

Cheiron recommends the Board review their funding policy and this ADC Benchmark prior to the December 31, 2023 actuarial valuation to reflect the updated Actuarial Standards of Practice No. 4 and Pension Review Board concerns.

The chart on the next page shows the results of the ADC benchmark.

SECTION V – ACTUARIALLY DETERMINED CONTRIBUTION BENCHMARK

Development of Actuarially Determined Contribution Benchmark		
For Plan Year Beginning 12/31 of:	**2022**	**2021**
Valuation Results		
Actuarial Liability	$ 1,394,695,732	$ 1,313,297,933
Actuarial Value of Assets	1,211,321,297	1,176,967,709
Unfunded Actuarial Liability (UAL)	$ 183,374,435	$ 136,330,224
Total Normal Cost	$ 31,261,216	$ 29,387,903
Covered Payroll	$ 105,372,248	$ 102,887,082
ADC Benchmark		
Normal Cost Rate	30.73%	29.61%
Amortization of UAL Rate	10.73%	7.80%
Total Cost Rate	41.46%	37.41%
Member Contribution Rate	18.70%	18.70%
City Contribution Rate Based on ADC Benchmark	22.76%	18.71%
Current City Contribution Rate	22.05%	22.05%
City Contribution Rate Surplus/(Deficit) Compared to ADC Benchmark	(0.71%)	3.34%
Payroll Growth Assumption	2.56%	2.98%

If the 20-year amortization period would be used, the City contribution rate based on the ADC benchmark would be 25.42%, producing a (3.37%) deficit relative to the current city contribution rate.

APPENDIX A – FUND MEMBERSHIP

The data for this valuation was provided electronically in Excel format by the Fund's office. Cheiron did not audit any of the data, but we did perform an informal examination of the obvious characteristics of the data for reasonableness and consistency in accordance with Actuarial Standard of Practice No. 23, Data Quality. The data for active and inactive members is as of December 31, 2022.

The following pages contain a summary of the data provided:

- Member status reconciliation from December 31, 2021 to December 31, 2022
- Active member statistics including age, service, and salary
- Age and service distribution for active members as of December 31, 2022
- Inactive member statistics including age and average benefit amounts
- DROP statistics and DROP balance reconciliation

APPENDIX A – FUND MEMBERSHIP

		Actives	Term Vested Or Awaiting Refund	Retirees	Disability Retirees	Beneficiaries and Alt Payees	Total
1.	December 31, 2021 Valuation	**1,175**	**29**	**756**	**16**	**152**	**2,128**
2.	Additions						
	a. New Entrants	79	2			11	92
	b. DROP Balance Only[1]					5	5
	c. Total	79	2	-	-	16	97
3.	Reductions						
	a. Benefits Expired						-
	b. Refunds		(7)				(7)
	c. Deaths with no Beneficiaries	(1)				(2)	(3)
	d. Total	(1)	(7)	-	-	(2)	(10)
4.	Changes in Status						
	a. Surviving Spouse						-
	b. Disabled						-
	c. Non Vested Termination	(8)	8				-
	d. Retired	(44)		45		(1)	-
	e. Terminated Vested	(2)	2				-
	f. Disabled						-
	g. Death with Beneficiaries			(8)	(1)	9	-
	h. Dependents					3	3
	i. Data Corrections		1			(6)	(5)
	j. Total	(54)	11	37	(1)	5	(2)
5.	December 31, 2022 Valuation	**1,199**	**35**	**793**	**15**	**171**	**2,213**

The header row above the data spans as "Table A-1 / Member Status Reconciliation".

[1] Alternate Payees with DROP balance only.

APPENDIX A – FUND MEMBERSHIP

Table A-2 Active Members Statistics			
	December 31, 2022	December 31, 2021	% Change
Active Members in Valuation			
Count			
Total	1,199	1,175	2.04%
Average Current Age			
Total	41.2	41.5	-0.63%
Average Service			
Total	11.9	12.2	-1.97%
Average Reported Pay			
Total	$87,220	$85,911	1.52%

APPENDIX A – FUND MEMBERSHIP

AGE/SERVICE DISTRIBUTION OF ACTIVE MEMBERS
ACTIVE MEMBERS AS OF DECEMBER 31, 2022

COUNTS BY AGE/SERVICE

Age	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 & up	
Under 25	16	9	0	0	0	0	0	0	0	0	25
25 to 29	32	69	4	0	0	0	0	0	0	0	105
30 to 34	22	114	58	2	0	0	0	0	0	0	196
35 to 39	9	94	106	23	13	0	0	0	0	0	245
41 to 44	0	9	63	62	57	20	0	0	0	0	211
45 to 49	0	0	11	30	73	59	8	0	0	0	181
50 to 54	0	0	0	3	41	71	47	2	0	0	164
55 to 59	0	0	0	0	4	17	36	10	0	0	67
60 to 64	0	0	0	0	0	0	2	2	1	0	5
65 to 69	0	0	0	0	0	0	0	0	0	0	0
70 & up	0	0	0	0	0	0	0	0	0	0	0
Total	79	295	242	120	188	167	93	14	1	0	1,199

Average Age = 41.2   Average Service = 11.9

APPENDIX A – FUND MEMBERSHIP

Table A-3 Inactive Member Statistics			
	December 31, 2022	**December 31, 2021**	**% Change**
Vested Terminated Members and Awaiting Refund			
Count			
Total	35	29	20.69%
Average Current Age			
Total	39.4	38.6	1.95%
Retirees, including DROP Members			
Count			
Total	793	756	4.89%
Average Current Age			
Total	65.7	66.4	-1.05%
Average Monthly Benefit			
Total	$5,956	$5,928	0.47%
Disability Retirees			
Count			
Total	15	16	-6.25%
Average Current Age			
Total	67.1	67.5	-0.59%
Average Monthly Benefit			
Total	$3,825	$3,848	-0.60%
Beneficiaries and Alternate Payees			
Count			
Total	171	152	12.50%
Average Current Age			
Total	68.1	70.0	-2.71%
Average Monthly Benefit			
Total	$2,825	$2,912	-2.99%

APPENDIX A – FUND MEMBERSHIP

Table A-4 DROP Statistics and DROP Balance Reconciliation		December 31, 2022		December 31, 2021	% Change
Number of DROP		331		312	6.10%
Total DROP Balance	$	157,393,946	$	151,493,773	3.90%
As a % of Trust Assets		14.10%		11.60%	21.60%
Average DROP Balance	$	475,510	$	479,138	-0.80%
Reconciliation of DROP Balances					
12/31/2021 Balance			$	151,493,773	
Deposits				18,627,812	
Interest				7,607,488	
Withdrawals				(20,335,127)	
12/31/2022 Balance			$	157,393,946	

APPENDIX B – SUMMARY OF PLAN PROVISIONS

1. **Membership Requirement**

   All commissioned civil service and Texas state-certified firefighters with at least six months of service employed by the City of Austin fire department.

2. **Salary**

   Salary (compensation) means base pay and longevity pay. No other forms of pay are included within the pensionable salaries.

3. **Average Monthly Compensation**

   The average of the member's compensation for the 36 months of highest compensation.

4. **Service Credit**

   One month of service credit is earned for each month the member makes the required contribution to the Fund.

5. **Member Contributions**

   18.70% of Salary

6. **Normal Retirement**

Eligibility:	Age 50 with 10 years of service or 25 years of service regardless of age.
Amount:	3.3% of average monthly compensation for each year of service with a minimum of $2,000 per month.
Normal Form of Payment:	Life Annuity with 75% continued to the Surviving Spouse (or designated beneficiary if the participant is not married).

7. **Early Retirement**

Eligibility:	Age 45 with 10 years of service or 20 years of service regardless of age.
Amount:	3.3% of average monthly compensation for each year of service.

8. **Disability Retirement**

Eligibility:	Upon approval of disability by the Board of Trustees.
Amount:	3.3% of average monthly compensation for each year of service (but not less than 20 years).

APPENDIX B – SUMMARY OF PLAN PROVISIONS

9. Death while an Active Employee

Eligibility:	Termination of employment due to death
Amount:	Surviving spouse or designated beneficiary will receive 75% of the member's accrued benefit based on the greater of their service at death or 20 years of service.
	Each dependent child of a surviving spouse will receive 15% of the Member's accrued benefit, but not less than 9.9% of Average Monthly Compensation with reduction if there are more than five surviving dependent children.

10. Deferred Retirement

Eligibility:	Ten years of service. Must also elect to leave their member contributions in the Fund.
Amount:	Accrued benefit payable at Normal Retirement eligibility.

11. Non-Vested Termination

Eligibility:	Less than ten years of service.
Amount:	Lump sum of member contributions with accumulated interest.

12. Deferred Retirement Option Plan (DROP)

Under this program a member eligible for service retirement may elect to continue in active service as a firefighter but have the fund begin crediting "payments" to a deferred retirement option plan (DROP) account. The monthly "payments" would be an amount equal to what the member's monthly annuity would have been if the member had retired as of that eligible DROP date. Any eligible cost-of-living adjustments (COLAS) would be applied to the monthly annuity during this DROP period. During the DROP period, the member would have all their pension contributions and applicable annual interest of 5% compounded monthly credited to their account. When the member retires, by terminating their active service in the fire department, an accumulated lump sum balance may be available to be distributed (all or part) to the member from the DROP account.

In lieu of electing to participate in the DROP before actual retirement, a member who is eligible for normal service retirement may elect to terminate active service as a firefighter and establish the DROP account at termination. Under this "RETRO or BACK DROP," the firefighter's DROP account reflects the accrual from the actual termination date back to a date on or after the date which they become eligible for normal service retirement.

APPENDIX B – SUMMARY OF PLAN PROVISIONS

The maximum period under which a firefighter can participate in a DROP is seven years. A firefighter may elect to establish a DROP account after reaching normal or early service retirement eligibility. Currently there are a total of twelve draws allowed while the retiree's DROP account balance remains in the pension plan. The number of draws can be set by pension board policy as determined feasible. The draws can either be in the form of a distribution to the retiree (provided the retiree reached age 50 before retiring), or a rollover into a qualified IRA. The entire DROP balance must be withdrawn from the fund by April 1st of the calendar year following the year the retiree reaches age 70 ½.

13. **Cost of Living Adjustments (COLA)**

Eligible pension recipients are entitled to annual cost-of-living adjustments (COLA) when deemed affordable. COLAs are approved only when the fund's actuary has advised the Board that the adjustment would not impair the financial stability of the fund based on the COLA Adjustment Policy approved by the Board. The COLAs are to be based on the annual percentage increase in the Consumer Price Index (CPI-U).

Members who retire under Early Retirement are not eligible for COLAs until they would have reached Normal Service Retirement eligibility had they continued in employment.

14. **Changes Since Last Valuation**

None.

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

A. Actuarial Assumptions

1. Rate of Investment Return

7.30% compounded annually, net of investment and administration expenses.

2. Rates of Salary Increase

Salary increases are split into a wage inflation assumption of 3.00% and a merit scale based on service, shown below.

Years of Service	Increase
0	5.50%
1	7.00%
2	7.00%
3	2.50%
4	0.50%
5	4.00%
10	1.00%
15	1.00%
20	4.50%
21	0.50%
22+	0.25%

3. Aggregate Payroll Growth

2.50% per year

4. Disability

Age	Rate
Under 30	0.02%
30-39	0.06
40-49	0.10
50+	0.05

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

5. Mortality Rates

Active Lives:
PubS-2010 Mortality Table for Employees.

Retiree and Vested Terminated Lives:
PubS-2010 Mortality Table for Healthy Retirees.

Contingent Survivor Lives:
PubS-2010 Mortality Table for Contingent Survivors.

Disabled Lives:
PubS-2010 Mortality Table for Disabled Retirees.

Generational mortality improvements are projected from 2010 using scale MP-2021.

6. Withdrawal

Withdrawal rates are based on department and service, shown below.

Years of Service	Rate
0-7	1.0%
8-13	0.5
14+	0.0

7. Retirement Rates

Years After Early Retirement Eligibility	Rate
0	1.5%
1	1.5
2	1.5
3	1.5
4	2.0
5	4.0
6	5.0
7	5.0
8	7.5
9	10.0
10	16.7
11	16.7
12	20.0
13	20.0
14	30.0

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

15	30.0
16	30.0
17	50.0
18+	100.0

8. DROP Election

Members are assumed to elect either normal retirement or DROP with the DROP period that maximizes the present value of their retirement benefits, including reflecting the impact of previously granted COLAs the member would be eligible for during the assumed DROP period.

9. Cost-of-Living Adjustment Assumption

0% for future years.

10. Percent Married

100% of actives are assumed to be married.

11. Spouse Age

A husband is assumed to be four years older than his wife.

12. Dependent Children

50% of active members are assumed to have dependent children and the youngest child is assumed to be one year old.

13. Technical and Miscellaneous Assumptions

Decrement timing: Middle of year, except at 100% retirement, which is assumed at the beginning of the year.

Terminated vested members: All terminated vested members are assumed married and assumed to retire at normal retirement eligibility.

14. Disclosures regarding Models Used

In accordance with Actuarial Standard of Practice (ASOP) No. 56 *Modeling*, the following disclosures are made:

A. Valuation Software

Cheiron utilizes ProVal, an actuarial valuation software program leased from Winklevoss Technologies (WinTech), to calculate liabilities and projected benefit

payments. We have reviewed the underlying workings of this model to the degree feasible and consistent with ASOP No. 56 and believe them to be appropriate for the purposes of the valuation.

B. Projections

This valuation report includes projections of future contributions and funded status for the purpose of assisting the Board of Trustees and the sponsors of the Fund with the management of the Fund.

The projections are based on the same census data and financial information as of December 31, 2022 as disclosed in this actuarial valuation. The projections assume continuation of the plan provisions and actuarial assumptions in effect as of December 31, 2022. They do not reflect the impact of any changes in benefits or actuarial assumptions that may be adopted after December 31, 2022.

The projections assume that all future assumptions are met except where specifically indicated. The future outcomes become increasingly uncertain over time, and therefore the general trends and not the absolute values should be considered in the review of these projections. Further, for the purpose of these projections, we have only reflected the impact of new entrants entering the plan in aggregate and have not developed individual liabilities or detailed profiles related to these potential new entrants. We feel this is appropriate for the purpose of these projections, but if they were to be used for other purposes, this may not be appropriate and alternative projections may need to be developed.

15. Changes since Last Valuation

The mortality assumption was changed from the PubS-2010 Above Median Income table with mortality improvements projected five years past the valuation date using MP-2021 to the PubS-2010 table with mortality improvements projected from the base year 2010 generationally using MP-2021.

The DROP period assumption was changed from a rate table to the DROP period that maximizes the value of the retirement benefits, including any previously granted COLAs the active member is eligible for during the DROP.

16. Rationale for Assumptions

The actuarial assumptions, except for those noted as changed for this valuation, were chosen by the Board of Trustees, upon the recommendation of the actuaries, based on an experience study issued by the Fund's prior actuary on April 21, 2020 based on data through December 31, 2019. The assumptions changed for this valuation were adopted by the Board at the April 24, 2023 meeting.

APPENDIX C – ACTUARIAL ASSUMPTIONS AND METHODS

B. Actuarial Methods

1. **Funding Method**

Liabilities and contributions shown in this report are computed using the entry age normal method of funding. Under this funding method, a normal cost rate is determined as a level percentage of pay for each active member. The normal cost rate times payroll equals the total normal cost for each member. The normal cost-plus member contributions will pay for projected benefits at retirement for each active Fund member.

The actuarial liability is that portion of the present value of future benefits that will not be paid by either future employer normal cost contributions or member contributions. The difference between this liability and the assets accumulated as of the same date is referred to as the unfunded actuarial liability (UAL).

2. **Asset Valuation Method**

The actuarial value has been calculated by taking the market value of assets less 80% of the investment gain (loss) during the preceding year, less 60% of the investment gain (loss) during the second preceding year, less 40% of the investment gain (loss) during the third preceding year, and less 20% of the investment gain (loss) in the fourth preceding year.

The investment gain (loss) is calculated by taking the difference between the expected market value of assets based on an investment return assumption and the actual market value of assets.

3. **Amortization Method**

Not applicable since the employer contribution rate is set by State Statute. For the Actuarially Determined Contribution Benchmark, the amortization method is an open 30-year level percentage of pensionable pay amortization based on a payroll growth assumption of 2.56%.

4. **Changes since Last Valuation**
None.