# Fire and Police Pension Association Statewide Retirement Plan

## Actuarial Valuation Report for the Year Beginning January 1, 2023

P: 720.274.7270 | www.grsconsulting.com

June 30, 2023

Board of Directors
Fire and Police Pension Association
7979 East Tufts Avenue, Suite 900
Denver, Colorado 80237

**Re: Actuarial Valuation of the FPPA Statewide Retirement Plan (Plan) as of January 1, 2023**

Dear Members of the Board:

We are pleased to present our Report on the actuarial valuation of the Statewide Retirement Plan for the Fire and Police Pension Association (FPPA) as of January 1, 2023.

We certify that the information included herein and contained in our 2023 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the FPPA Statewide Retirement Plan as of January 1, 2023.

Our Report presents the results of the January 1, 2023 actuarial valuation of the FPPA Statewide Retirement Plan (SRP). The Report describes the current actuarial condition of the SRP, determines sufficiency of contribution rates, determines COLA levels based on Board policy and analyzes changes in these metrics. The results presented herein may not be applicable for other purposes. In addition, the Report provides various summaries of the data.

Valuations are prepared annually, as of January 1st, the first day of the FPPA plan year.

***Creation of the Statewide Retirement Plan and Associated Legislation***

House Bill 22-1034 was signed into law on March 30, 2022 to become effective January 1, 2023. HB 22-1034 combined the assets and liabilities of the former Statewide Defined Benefit Plan (SWDB) and the Statewide Hybrid Plan - Defined Benefit Component (SWH) to form the Statewide Retirement Plan. There are now four Components covered under the Statewide Retirement Plan:

- Defined Benefit Component
- Hybrid Defined Benefit Component
- Social Security Component
- Money Purchase Component

In addition to the merging of the two plans, the bill adopted a Rule of 80 provision and granted an increased 1.90% multiplier on service through January 1, 2023 for members of the former Statewide Hybrid Plan – Defined Benefit Component (now covered under the Hybrid Defined Benefit Component of the Statewide Retirement Plan). The legislation also increased required minimum contributions for both members covered under the Hybrid Defined Benefit Component and their employers. The legislation did not change benefit provisions for any of the members of the former Statewide Defined Benefit Plan (now covered under the

Defined Benefit Component of the Statewide Retirement Plan) other than to allow voluntary participation in the Money Purchase Component.

The intent of these changes was to bring the funding levels of the former Statewide Defined Benefit Plan and Statewide Hybrid Plan – Defined Benefit Component into alignment at the Statewide Defined Benefit Plan levels, both at the time of the merger, and going forward. Given this intent, in some instances where noted, funding metrics shown for the prior year are those of the Statewide Defined Benefit Plan as these are the most comparable metrics. However, unless otherwise noted, information shown for the prior year shows the sum total of the Statewide Defined Benefit Plan and the Statewide Hybrid Plan – Defined Benefit Component metrics. The gain loss on page 17 shows a reconciliation from last year to this year, including the impact of the assumption changes, the Hybrid Defined Benefit Component benefit changes, as well as plan experience during the year.

***Contribution Sufficiency***

Contribution rates are established by law as a percentage of payroll and vary by Component. Currently those rates are scheduled to increase each year until 2030, ultimately reaching a total of 25%, 12.5% and 18% on Defined Benefit Component, Social Security Component and Hybrid Defined Benefit Component payroll, respectively. The total blended statutory contribution rate reflecting member and employer contributions across all Components for 2023 is 21.29%. Appendix B further outlines the contribution rates for the components of the SRP plan.

This valuation finds that:

1. Contribution rates are expected to be sufficient to fund the base benefits (no COLAs). It is anticipated that base benefits can be funded with 17.45% of pay.

2. Contributions in excess of 17.45% of pay are used to increase reserves available to pay COLAs and to manage adverse experience. If the Board continues its current COLA policy and assumptions are met, the statutory contributions are expected able to provide for increased COLAs over time.

3. The goal of increasing contributions and the reserving strategy is to eventually provide COLAs that would provide inflation protection to FPPA members, currently assumed to be approximately 2.50% per year. The current COLA reserve and contribution levels are not sufficient to provide 2.50% COLAs at this time as the Actuarially Determined Contribution needed to support this level of benefits is 30.32% of payroll. Immediately providing COLAs at this level would make the plan unsustainable, even with the scheduled contribution increases.

**Reserve for COLAs and to Manage Adverse Experience**

As of January 1, 2023, the Plan has $66 million in reserve for COLAs and to manage adverse experience. This amount is down from $191 million (combined SWDB and SWH plans) as of January 1, 2022. The depletion of the reserve was due to a combination of liability losses associated with salary increases greater than assumed, investment losses, COLAs granted in 2022, assumption changes in connection with the experience study, and benefit improvements for the SWH Component.

Converting the $66 million reserve into an annual COLA for all participants results in a 0.15% annual COLA, which would be the recommended "Breakeven" 2023 COLA provided per the Board policy.

***Benefit provisions***

All of the benefit provisions reflected in this valuation are those which were in effect on January 1, 2023. As mentioned, as part of House Bill 22-1034, members covered under the Hybrid Component are now eligible for unreduced benefits at age 50 with Rule of 80, and are also eligible for an increased multiplier on service earned prior to January 1, 2023. There were no other changes to the benefit provisions since the prior valuations. The benefit provisions are summarized in Appendix B of our Report.

***Assumptions and methods***

The current actuarial methods and assumptions were selected by the Board of Directors of FPPA based upon the actuary's analysis and recommendations from the 2022 Experience Study, for first use in this valuation. For information regarding the rationale for the assumptions chosen, please see the experience study report dated June 20, 2022.

The assumptions and methods are detailed in Appendix A of our Report. The Board of Directors has sole authority to determine the actuarial assumptions used for the Plan. The assumptions that are based upon the actuary's recommendations are internally consistent and are reasonable based on the actual past experience of the Plan.

The actuarial assumptions represent estimates of future experience and are not market measures. The results of any actuarial valuation are dependent upon the actuarial assumptions used. Actual results (and future measures) can and almost certainly will differ, as actual experience deviates from the assumptions. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution rates and funding periods. The actuarial calculations presented in this Report are intended to provide information for rational decision making.

This report was prepared using our proprietary valuation model and related software which in our professional judgement has the capability to provide results that are consistent with the purposes of the valuation and has no material limitations or known weaknesses. We performed tests to ensure that the model reasonably represents that which is intended to be modeled.

***Data***

FPPA supplied data for retired, active and inactive members as of January 1, 2023. We did not audit this data, but we did apply a number of tests to the data, and we have concluded that the data is reasonable and consistent with the prior year's data. FPPA also supplied asset data as of January 1, 2023.

***GASB Accounting***

Plan reporting information for GASB Statement No. 67 can be found in the FPPA Annual Comprehensive Financial Report at FPPA's website - FPPAco.org. Employer reporting information for GASB Statement No. 68 is provided in a separate report to the employer.

***Certification***

All of our work conforms with generally accepted actuarial principles and practices, and to the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, our calculations also comply with the requirements of Colorado state law and, where applicable, the Internal Revenue Code.

The undersigned are independent actuaries and consultants. Joseph Newton and Dana Woolfrey are Enrolled Actuaries and are Members of the American Academy of Actuaries, and meet the Qualification Standards of the American Academy of Actuaries. Both of the undersigned are experienced in performing valuations for large public retirement systems.

Respectfully submitted,

**Gabriel, Roeder, Smith & Company**

Joseph P. Newton, FSA, EA, MAAA
Pension Market Leader and Actuary

Dana Woolfrey, FSA, EA, MAAA
Senior Consultant and Actuary

# Table of Contents

# SECTION I

## EXECUTIVE SUMMARY

# Executive Summary

The Actuarial Information Section below shows a comparison of funding metrics for the Statewide Retirement Plan as of January 1, 2023 and the Statewide Defined Benefit Plan as of January 1, 2022. The deterioration in funding is primarily due to earning investment returns that were significantly less than expected during 2022. No decline in funded status occurred due to the merger with the Statewide Hybrid Plan – Defined Benefit Component. This plan merger was specifically designed in conjunction with benefit changes for the Hybrid Component members to be funding-neutral to the former Statewide Defined Benefit Plan.

| Item | January 1, 2023 | January 1, 2022 |
|---|---|---|
| *Membership* | | |
| • Number of: | | |
| - Active members | 9,986 | 9,525 |
| - Retirees | 1,959 | 1,756 |
| - DROP Retirees | 372 | 397 |
| - Beneficiaries | 158 | 142 |
| - Inactive members | 2,039 | 1,734 |
| - Total | 14,514 | 13,554 |
| • Annualized payroll supplied by FPPA | $ 911,151 | $ 819,299 |
| *Assets* | | |
| • Market value | $ 3,770,863 | $ 4,009,828 |
| • Actuarial value | $ 3,924,584 | $ 3,621,209 |
| • Rate of return on market value* | (8.0%) | 14.6% |
| • Rate of return on actuarial value* | 6.0% | 10.5% |
| • Ratio of actuarial value to market value* | 104.1% | 90.3% |
| *Actuarial Information** | | |
| Base Benefits | | |
| • Funded Ratio | 100.0% | 100.0% |
| • Reserve available to provide future COLAs | $ 66,419 | $ 164,451 |
| • Reserve as a % of base liabilities | 1.7% | 4.9% |
| • Reserve converted to long-term COLA ("Breakeven") | 0.15% | 0.40% |
| With long-term COLA assumption of 2.50% | | |
| • Funded Ratio | 78.8% | 80.3% |
| • Unfunded actuarial accrued liability | $ 1,057,821 | $ 861,216 |

*Amounts shown for 2022 reflect results for former Statewide Defined Benefit Plan
Note: Dollar amounts in $000

# Executive Summary (Continued)

1. As of January 1, 2023, the Plan has $66 million in reserve for COLAs and to manage adverse experience. This is down from $191 million (combined SWDB and SWH plans) as of January 1, 2022.
    a. The 2022 COLA decreased the reserve $7 million.
    b. The assets for the combined former Statewide Defined Benefit Plan and Statewide Hybrid Plan – Defined Benefit Component earned -8.00% on a market basis in 2022. Based on the smoothing mechanisms used in the valuation process, this decreased the reserve by $38 million.
    c. In addition, salary increases for continuing active members were higher than current assumptions, decreasing the Reserve $78 million.
    d. The changes in the assumptions per the experience study decreased the Reserve another $59 million.
    e. These items were offset by liability gains from turnover and other smaller factors.

2. Converting the $66 million reserve into an annual COLA for all participants results in a 0.15% annual COLA, which would be the 2023 recommended Breakeven COLA provided per the Board policy. The Board's policy considers the size of the reserve in comparison to the accrued benefits of all current members and estimates the COLA that could be provided in perpetuity across all generations of current members.

3. Given the plan's statutory contribution policy and the Board Benefits Policy in regard to granting COLAs, if all actuarial assumptions are met (including the assumption of the plan earning 7.00% on the actuarial valuation of assets), it is expected that:
    a. The employer normal cost as a percentage of pay will remain level over time,
    b. The COLA Reserve will continue to increase slowly,
    c. The amount of COLA that can be provided will increase slowly, and
    d. The funded status of the plan will increase gradually.

4. As a long term target we have provided full actuarial valuation results based on an annual COLA equal to the current inflation assumption of 2.50%. On that basis the SRP would have an Unfunded Actuarial Accrued Liability of $1.06 billion and a funded ratio of 79%. Thus, the Actuarially Determined Contribution necessary to sustain an annual 2.50% COLA from today forward is 30.32% of payroll. This compares to the current contribution levels of 21.29% of payroll, which shows the SRP cannot afford COLAs of this level at this time.

5. However, the ultimate contribution rates from House Bill 22-1034 are anticipated to accumulate assets in a way to provide COLAs of approximately that level when members hired today reach retirement age. However, this must be a long, gradual process to reach those levels for the plan to be sustainable.

6. We recommend continuing the practices that have produced these results to date, including the disciplined, long-term focused approach to decision making.

***Projected Actuarial Results***

The table below shows the Reserve and Associated COLA projected over the next five years given alternative investment returns on the market value of assets.

With the exception of the market value investment returns, the projections are based on the same assumptions, methods and provisions used for the January 1, 2023 valuation. The projections assume the Board will grant COLAs and supplemental payments according to their current benefits policy. The 3.00% and 7.00% scenarios shows deterioration in the reserve due to future recognition of outstanding deferred market value investment losses as of January 1, 2023. The reserve as of January 1, 2023 on a smoothed asset basis is $66 million, however, there is actually a shortfall of $87 million on a market value basis as compared to liabilities for base benefits. For additional information see the “Discretionary Cost-of-Living Adjustments” portion of the Discussion Section.

| 5-Year Deterministic Projection | | | | | | |
|---|---|---|---|---|---|---|
| January 1, | Market Value Investment Return | | | | | |
| | 3.00% | | 7.00% | | 11.00% | |
| | Reserve | Breakeven COLA Supported by Reserve | Reserve | Breakeven COLA Supported by Reserve | Reserve | Breakeven COLA Supported by Reserve |
| 2023 | $66 | 0.15% | $66 | 0.15% | $66 | 0.15% |
| 2024 | $26 | 0.06% | $57 | 0.12% | $94 | 0.19% |
| 2025 | -$35 | 0.00% | $60 | 0.12% | $174 | 0.32% |
| 2026 | -$130 | 0.00% | $70 | 0.13% | $303 | 0.53% |
| 2027 | -$263 | 0.00% | $86 | 0.15% | $490 | 0.80% |
| 2028 | -$400 | 0.00% | $149 | 0.23% | $745 | 1.14% |

Due to the limited scope of our assignment, we did not perform an analysis of the potential range of future actuarial measurements other than that shown above.

# Section II

## Discussion

## Creation of the Statewide Retirement Plan and Associated Legislation

House Bill 22-1034 was signed into law on March 30, 2022 to become effective January 1, 2023. HB 22-1034 combined the assets and liabilities of the former Statewide Defined Benefit Plan and the Statewide Hybrid Plan – Defined Benefit Component to form the Statewide Retirement Plan. There are now four Components covered under the Statewide Retirement Plan:

- Defined Benefit Component
- Hybrid Defined Benefit Component
- Social Security Component
- Money Purchase Component

In addition to the merging of the two plans, the bill adopted a Rule of 80 provision and granted an increased 1.90% multiplier on service through January 1, 2023 for members of the former Statewide Hybrid Plan (now covered under the Hybrid Defined Benefit Component of the Statewide Retirement Plan). The legislation also increased requirement minimum contributions for both members covered under the Hybrid Defined Benefit Component and their employers. The legislation did not change benefit provisions for any of the members of the former Statewide Defined Benefit Plan (now covered under the Defined Benefit Component of the Statewide Retirement Plan) other than to allow voluntary participation in the Money Purchase Component.

The intent of these changes was to bring the funding levels of the former Statewide Defined Benefit Plan and Statewide Hybrid Plan – Defined Benefit Component into alignment at the Statewide Defined Benefit Plan levels, both at the time of the merger, and going forward.

## Contribution Sufficiency

*Statutory Contributions*

Members of the Defined Benefit Component contribute 12.00% of base salary. Employers currently contribute 9.50% of pay in 2023, and this amount is scheduled to increase 0.50% per year until an ultimate rate of 13.00% is reached in 2030.

Members of the Social Security Component and their employers contribute half the rates of the Defined Benefit Component.

Members of the Hybrid Defined Benefit Component and their employers must both contribute at least 8.125% of base salary, and this amount is scheduled to increase 0.125% until the ultimate rate of 9.000% is reached in 2030. Each year, the Board has discretion in setting the portion of total contributions from Hybrid Component members that is allocated to the funding of the defined benefits under the SRP. Any excess contributions go into the Money Purchase Component. The recommended allocation in this report of 14.24% reflects the intention that Hybrid Component Members and Defined Benefit Members should contribute equally toward the funding of their relative benefit levels.

Members and their employers in any Component can contribute in excess of the required amounts stated above. Any excess contributions go into the Money Purchase Component.

There are also additional contribution requirements for employers that reenter the plan. For employers that reentered the plan prior to January 1, 2021, an additional 0.2% of pay contribution is required. Employers reentering the plan on or after January 1, 2021 have additional contributions determined that reflect the demographics of the specific covered group.

### *Actuarially Determined Contributions and Contribution Sufficiency*

The Actuarially Determined Contribution assuming no future cost-of-living adjustments (COLAs) is 17.45% of pay. Although the Board retains discretion to provide no benefit adjustment, this should not be viewed as a reasonable metric for contribution sufficiency so long as providing COLAs is an ongoing objective.

The Actuarially Determined Contribution assuming annual cost-of-living adjustments of 2.50% per year is 30.32% of pay. This too may not be a reasonable metric for contribution sufficiency as it does not reflect the Board Benefits Policy for setting COLAs which, although subject to Board discretion, reflects only currently available funding.

A Reasonable Actuarially Determined Contribution for the Plan is the greater of the Actuarially Determined Contribution assuming no future cost-of-living adjustments, 17.45%, and the Normal Cost (including administrative expenses) assuming annual cost-of-living adjustments of 2.50% per year, which is 22.38%. This Actuarially Determined Contribution of 22.38% reflects that current funding levels are not sufficient to provide inflation-like COLAs for all generations; however, over time, funding levels and the COLAs associated with them are expected to improve, assuming the Board continues its current Benefits Policy and contribution rates increase as currently scheduled.

**The total blended contribution rate reflecting member and employer contributions across all Components for 2023 is 21.29%. This compares to the Reasonable Actuarially Determined Contribution of 22.38%. Although not currently meeting this objective, it is anticipated that over time, with the scheduled contribution increases, the total blended rate will meet the objective.**

## Discretionary Cost-of-living Adjustments and One-Time Lump Sum Payments

On October 1st of each year, annuitants may receive a cost-of-living adjustment (COLA) at the discretion of the Board of Directors. The increase can range from 0.00% to the higher of 3.00% or the change in CPI-W. The current Board policy, adopted on April 20, 2023, determines the COLA which can be supported on an actuarial basis using only current surplus assets. To the extent there are deferred market gains available, these can be used in the measurement of surplus assets to support as much as a 0.50% COLA.

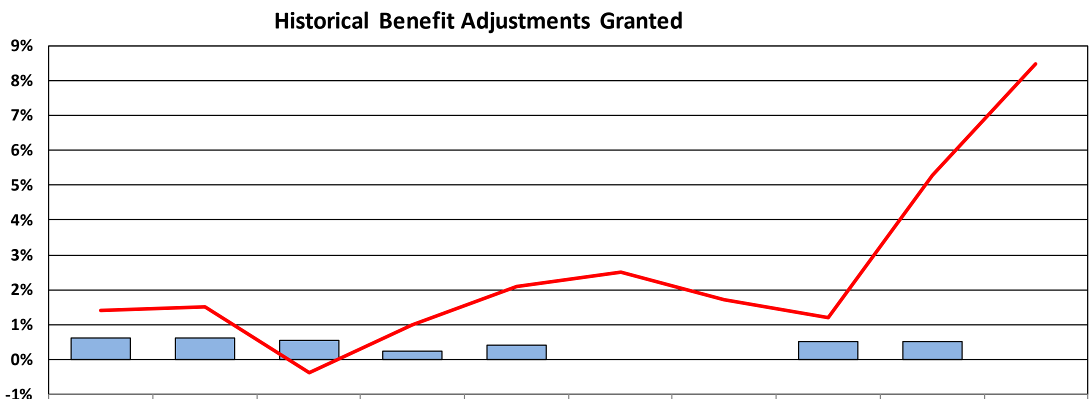
The chart below shows the benefit adjustments granted by the Board during the last 10 years and the change in CPI-W during that period. The current valuation results indicate that on a smoothed asset basis the Plan can currently support an annual COLA of **0.15%** per year and remain 100% funded. If all assumptions are met, it is expected that the current funding policy will increase the plan's surplus over time and the COLAs supported by the Board policy will increase.

In addition to the COLA, the Board policy contains a provision for a supplemental one-time lump sum if the following conditions are met:

1. The COLA determined above is less than 1.00%; and
2. The average annual investement return over the prior 5 years is at least 6.50%.

If these conditions are met, the supplemental one-time lump sum shall be the increase in CPI-W less the COLA amount determined for the year multiplied by benefits paid during the prior 12-month period. The change in the average CPI-W for calendar year 2022 over calendar year 2021 was 8.50%. Thus the supplemental one-time lump sum is **8.35%** (8.50% - 0.15%) of annual benefits.

This policy is designed to be sustainable over the long-term while being responsive in a meaningful way to current high inflation conditions.




| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|
| Granted Adjustment | 0.61% | 0.60% | 0.56% | 0.25% | 0.39% | 0.00% | 0.00% | 0.50% | 0.50% | TBD |
| Prior Year CPI-W | 1.40% | 1.50% | -0.40% | 1.00% | 2.10% | 2.50% | 1.70% | 1.20% | 5.30% | 8.50% |

*Amounts prior to 2023 reflect the history of the former Statewide Defined Benefit Plan.*

## Financial Data and Experience

This section provides an analysis of the change in Net Plan Assets during the year and an estimate of the yield on the combined assets of the former Statewide Defined Benefit Plan and Statewide Hybrid Plan. FPPA provided GRS with a summary of Plan assets as of January 1, 2023. The total market value of assets (MVA) reported was $3,771 million as of January 1, 2023, as compared to $4,010 million as of January 1, 2022. Table 6 shows data from some of the tables included in the annual financial statements of the Plan. Table 8 shows the estimated yield on a market value basis and on the actuarial asset valuation method.

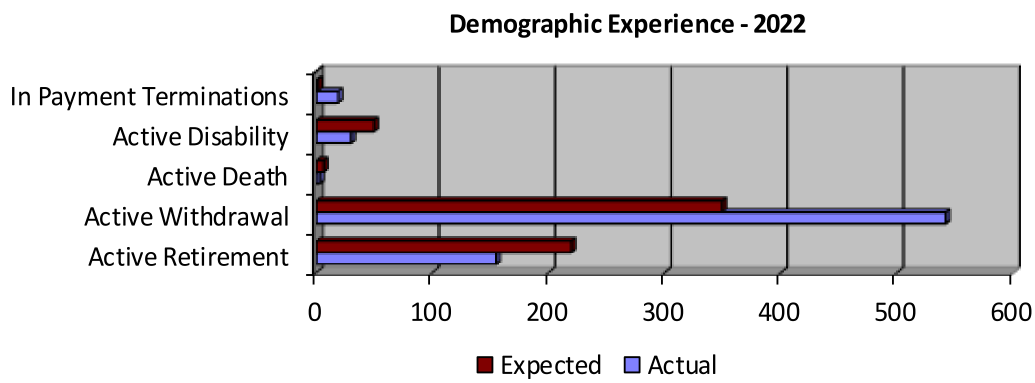
The asset valuation method uses a five-year phase in of the excess (shortfall) between expected investment return and actual income. Expected earnings used to project the actuarial value are determined using the assumed investment return rate and the beginning of year actuarial value of assets (adjusted for receipts and disbursements during the year).

Table 7 shows the development of the actuarial value of assets. The actuarial value of assets increased from $3,621.21 million to $3,924.58 million since the prior valuation. This increase was less than expected and produced a loss of approximately $38 million.

As indicated by item 8b of Table 8, the estimated return on mean market value was -8.00% in 2022, lower than the 7.00% assumption. The return on the actuarial value of assets was 5.95%, lower than the 7.00% assumption. This difference in the estimated return on market value and actuarial value illustrates the smoothing effect of the asset valuation method.

## Demographic Experience

The following charts provide a comparison of the actual experience versus the expected experience for selected demographic assumptions. For FY 2022, the actual salary increases were 103.5% of expected. **During the year, the plan had overall liability gains due to demographic experience. This was primarily due to more terminations than expected during the year.**




The In Payment Terminations above include deaths and benefits that were canceled for other reasons.

## Actuarial Methods and Assumptions

The valuation was prepared using the Entry Age Normal Method. This is the same funding method that has been used in prior years. The asset valuation method uses a five-year phase in of the excess/(shortfall) between expected investment return and actual income. See Appendix A for a complete description of this method.

The actuarial value of future benefits from the plan is based on several economic and non-economic assumptions. These are summarized in Appendix A. The economic assumptions include investment return and salary increases. Non-economic assumptions include rates of mortality, disability, and separation.

The following changes to assumptions have been made since the prior valuation based on the recommendations in the 2022 Experience Study.

- Mortality rates and mortality improvement were updated to reflect recently published tables.

- The step-rate increase portion of the salary scale was increased by 0.50% per year for the first 4 years of a member's career and 0.25% for years 5 through 14 in accordance with the observed experience.
- The general wage inflation assumption was reduced from 3.50% to 3.00%.
- Minor adjustments were made to termination and retirement rates to reflect observed experience.

## Significant Factors Affecting Trends in Actuarial Information

With the current contribution schedule, it is expected that the funded status of the plan will gradually improve over time. This will provide protection against adverse experience and increase the potential to pay future benefit adjustments.

## Risk Metrics

The Statewide Retirement Plan was largely formed by the membership of the former Statewide Defined Benefit Plan, a defined benefit plan for Colorado Fire and Police employees hired on or after April 8, 1978. Over time, as with all defined benefit plans, the Statewide Retirement Plan's active member population will stabilize and the retiree population will continue to grow, thus becoming more leveraged in relation to the active payroll. The funded status and contribution requirements will become more volatile as a result, and the Board will have to give added consideration to the impact from possible adverse experience.

The amounts shown reflect base benefits only, without consideration of future cost-of-living adjustments. Amounts for 2022 reflect the results of the former Statewide Defined Benefit Plan.

| Valuation Year | AVA as % of Covered Payroll | AAL as % of Covered Payroll | ADC as % of Covered Payroll | Increase in ADC if Assets Decrease 10% | Funded Ratio | Change in Funded Ratio if Assets Decrease 10% |
|---|---|---|---|---|---|---|
| 2007 | 295% | 241% | 8.29% | 1.61% | 122.5% | -12.3% |
| 2008 | 304% | 254% | 9.98% | 1.63% | 119.4% | -11.9% |
| 2009 | 253% | 251% | 12.51% | 1.36% | 101.0% | -10.1% |
| 2010 | 265% | 265% | 12.66% | 1.53% | 100.0% | -10.0% |
| 2011 | 306% | 297% | 12.28% | 1.60% | 102.9% | -10.3% |
| 2012 | 318% | 330% | 14.60% | 1.68% | 96.4% | -9.6% |
| 2013 | 338% | 346% | 14.38% | 1.80% | 97.9% | -9.8% |
| 2014 | 363% | 359% | 13.82% | 1.99% | 100.9% | -10.1% |
| 2015 | 389% | 375% | 13.59% | 2.10% | 103.8% | -10.4% |
| 2016 | 399% | 390% | 14.74% | 2.17% | 102.4% | -10.2% |
| 2017 | 399% | 393% | 14.98% | 2.15% | 101.4% | -10.1% |
| 2018 | 407% | 393% | 14.40% | 2.25% | 103.7% | -10.4% |
| 2019 | 397% | 402% | 16.97% | 2.64% | 98.6% | -9.9% |
| 2020 | 398% | 407% | 17.65% | 2.64% | 97.6% | -9.8% |
| 2021 | 418% | 418% | 17.06% | 2.15% | 100.0% | -10.0% |
| 2022 | 439% | 418% | 16.05% | 2.25% | 104.9% | -10.5% |
| 2023 | 431% | 423% | 17.45% | 2.39% | 101.7% | -10.2% |

*Data shown is for years in which GRS was the retained actuary.*

Additional risk metrics are shown in Appendix C.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Appendix A of this report. This report includes risk metrics as shown above and some additional information in Appendix C but does not include a more robust assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the plan's financial condition.

## Market Value Results

Investment gains and losses are smoothed over five years, and currently, the smoothed or actuarial value of assets is 104.1% of the market value. If the Funded Ratio for base benefits had been measured using the Market Value of Assets, it would be 97.7%.

# SECTION III

## TABLES

## Table 1 – Key Valuation Results (Base Benefits Only)

| | | January 1, 2023 | January 1, 2022 | | |
|---|---|---|---|---|---|
| | | | | [1] | [2] |
| | | Statewide Retirement Plan | [1] + [2] | Statewide Defined Benefit Plan | Statewide Hybrid Plan - DB Component |
| 1. | Covered payroll for upcoming year | $ 933,113,246 | $ 856,090,438 | $ 838,177,242 | $ 17,913,196 |
| 2. | Present value of future pay | $ 9,715,128,089 | $ 8,709,367,586 | $ 8,554,446,582 | $ 154,921,004 |
| 3. | Normal cost rate | | | | |
| | a. Defined benefit component (full) | 17.03% | N/A | 16.62% | N/A |
| | b. Hybrid component | 10.94% | N/A | N/A | 10.28% |
| | c. Defined benefit component (SS supplemental) | 8.67% | N/A | 8.28% | N/A |
| | d. Blended rate | 16.85% | N/A | 16.54% | 10.28% |
| 4. | Present value of future benefits | | | | |
| | a. Active members | $ 3,893,812,964 | $ 3,423,856,239 | $ 3,371,378,321 | $ 52,477,918 |
| | b. Inactive members (terminated vested and nonvested) | 198,258,469 | 174,359,709 | 166,533,971 | 7,825,738 |
| | c. Retirees and beneficiaries | 1,403,589,485 | 1,261,093,888 | 1,228,208,960 | 32,884,928 |
| | d. Reserve available to provide future COLAs | 66,418,509 | 191,234,002 | 164,450,871 | 26,783,131 |
| | e. Total | $ 5,562,079,427 | $ 5,050,543,838 | $ 4,930,572,123 | $ 119,971,715 |
| 5. | Present value of future normal costs | (1,637,495,830) | (1,429,334,993) | (1,413,515,628) | (15,819,365) |
| 6. | Total actuarial accrued liability [4.e] + [5] | $ 3,924,583,597 | $ 3,621,208,845 | $ 3,517,056,495 | $ 104,152,350 |
| 7. | Actuarial value of assets | $ 3,924,583,597 | $ 3,621,208,845 | $ 3,517,056,495 | $ 104,152,350 |
| 8. | Unfunded Actuarial Accrued Liability (UAAL) [6] - [7] | $ 0 | $ 0 | $ 0 | $ 0 |
| 9. | Item [4.d] converted to an annual COLA on the accrued benefits for all current participants | 0.15% | 0.46% | 0.40% | 3.00%+ |

*Illustrates Results as of January 1, 2022 as if SRP had been in effect in last year's valuation and what contribution rates, reserves, etc. would have been for comparison.

# Table 2 – Key Valuation Metrics Using Alternative Long-Term COLA Assumptions

Users of this report should be aware that valuation results depend heavily on the assumed cost-of-living adjustments. As such, we have shown key valuation results under alternative cost-of-living assumptions. The SRP, as it stands today, has very little pre-funded COLA. Current and future contribution rates are not sufficient to fund inflation-like COLAs for all retirees. However, current contribution rates, along with scheduled contribution rate increases are expected to increase the amount of funding available over time for COLAs and to protect against adverse experience.

| | | Assumed Long-Term Annual COLA | | |
|---|---|---|---|---|
| | | **0.00%** | **0.15%** | **2.50%** |
| | **Funded Status ($ in millions)** | | | |
| 1. | Total actuarial accrued liability | $3,858.2 | $3,924.6 | $4,982.4 |
| 2. | Actuarial value of assets | $3,924.6 | $3,924.6 | $3,924.6 |
| 3. | Unfunded actuarial accrued liability/(Surplus) | ($66.4) | $0.0 | $1,057.8 |
| 4. | Funded ratio | 101.7% | 100.0% | 78.8% |
| | **Determination of Contribution Sufficiency** | | | |
| 5. | Normal cost (blended) | 16.85% | 17.14% | 21.78% |
| 6. | Administrative expense | 0.60% | 0.60% | 0.60% |
| 7. | Amount needed to amortize unfunded liabilities | N/A | 0% | 7.94% |
| 8. | Total actuarial determined contribution | 17.45% | 17.74% | 30.32% |
| 9. | Expected blended contribution rate available during 2023 | 21.29% | 21.29% | 21.29% |
| 10. | Contribution sufficient to fund base benefits and assumed COLA for all members? | Yes | Yes | No |

A Reasonable Actuarially Determined Contribution for the Plan is the greater of the Actuarially Determined Contribution assuming no future cost-of-living adjustments (Item 8 under the 0.0% column), 17.45%, and the Normal Cost (including administrative expenses) assuming annual cost-of-living adjustments of 2.50% per year (Item 5 + Item 6 under the 2.50% column), which is 22.38%. This Actuarially Determined Contribution of 22.38% reflects that current funding levels and contributions are not sufficient to provide inflation-like COLAs for all generations, but will be able to do so over the long term.

# Table 3 - Reconciliation of the COLA Reserve
# Actuarial Gain/(Loss)

| | | Merged Plans | Statewide Defined Benefit Plan | Statewide Hybrid Plan - DB Component |
|---|---|---|---|---|
| 1. | Total amount available January 1, 2022 | **$ 191,234,002** | $ 164,450,871 | $ 26,783,131 |
| 1.b. | Item [1] after incorporation of the experience study recommendation | $ 131,822,650 | $ 106,341,578 | $ 25,481,072 |
| 2. | Total normal cost for year (Normal Cost % x actual payroll paid ) | (157,199,130) | (155,049,007) | (2,150,123) |
| 3. | Non service purchase contributions | 185,176,146 | 182,471,477 | 2,704,668 |
| 4. | Interest on [1.b] for one year | 9,227,585 | 7,443,910 | 1,783,675 |
| 5. | Interest on [2] and [3] for one-half year | 962,634 | 943,554 | 19,081 |
| 6. | Benefit improvements associated with House Bill HB22-1034 | (21,105,507) | 0 | (21,105,507) |
| 7. | Expected total amount available January 1, 2023 | $ 148,884,378 | $ 142,151,512 | $ 6,732,866 |
| 8. | Actual total amount available January 1, 2023 | **$ 66,418,509** | $ 60,493,837 | $ 5,924,672 |
| 9. | Actuarial gain/(loss) for the period [8] - [7] | $ (82,465,869) | $ (81,657,676) | $ (808,194) |
| | SOURCE OF GAINS/(LOSSES) | | | |
| 10. | Asset gain/(loss) (See Table 9) | $ (38,430,257) | $ (37,334,537) | $ (1,095,720) |
| 11. | Salary liability gain/(loss) for the period | (78,373,352) | (77,695,507) | (677,845) |
| 12. | Benefit Adjustment Granted as of October 1 | (7,127,593) | (6,141,045) | (986,548) |
| 13. | Other liability gain/(loss) for the period [9] - [10] - [11] - [12] | 41,465,332 | 39,513,413 | 1,951,919 |

# Table 4 - Development of the Recommended Defined Benefit Contribution Allocation for the Hybrid Defined Benefit Component

The Recommended Defined Benefit Contribution Allocation from Hybrid Defined Benefit Component members is designed such that Defined Benefit Component members and Hybrid Component members are expected to contribute equally during the year toward the cost of their relative benefit levels. The total contribution rate for Defined Benefit Component members during the period from July 1, 2023 through June 30, 2024 is 21.75%, 123% of the cost to cover ongoing base benefit accruals and expenses for the Defined Benefit Component.

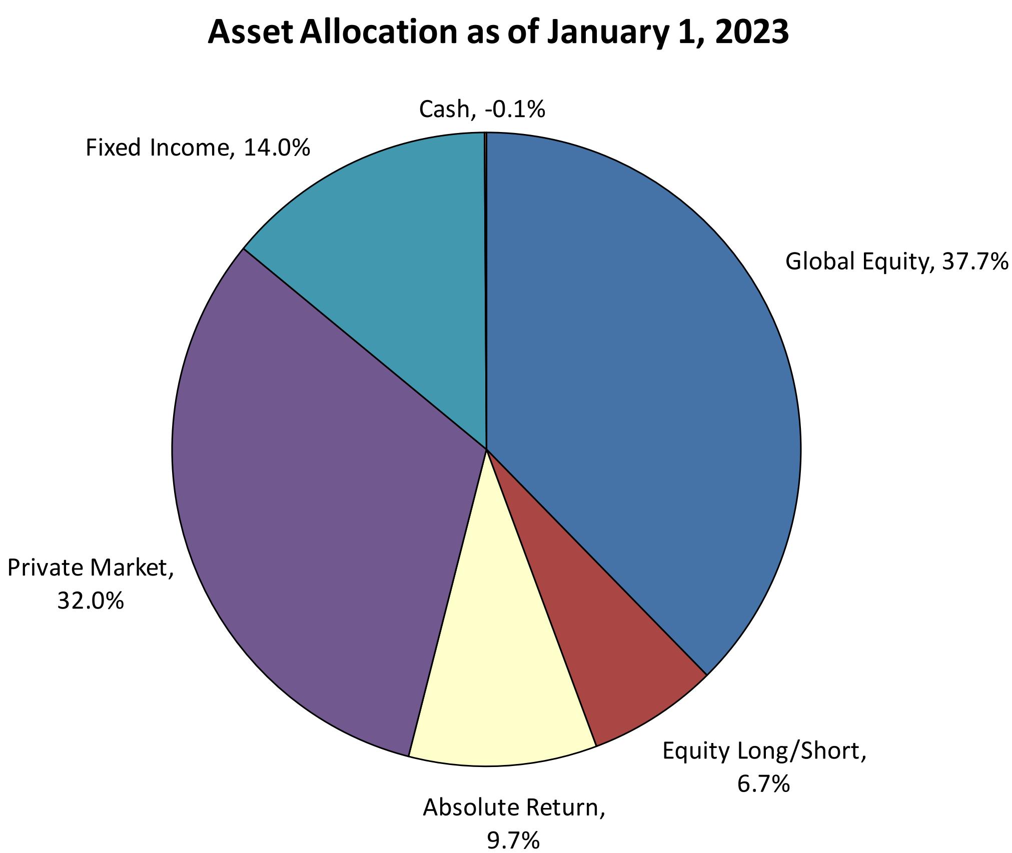
As such, it is recommended that the Defined Benefit Contribution Allocation for the Hybrid Defined Benefit Component members be set to 14.24%, which is also 123% of the cost to cover ongoing base benefit accruals and expenses for that Component.

| | Defined Benefit Component | |
|---|---|---|
| 1. | Normal cost (base benefits) | 17.03% |
| 2. | Administrative expense | 0.60% |
| 3. | Total ongoing expense (base benefits) | 17.63% |
| 4. | Total contribution rate available during 2023/2024* | 21.75% |
| 5. | Contribution rate relative to ongoing expense | 123% |
| | **Hybrid Component** | |
| 1. | Normal cost (base benefits) | 10.94% |
| 2. | Administrative expense | 0.60% |
| 3. | Total ongoing expense (base benefits) | 11.54% |
| 4. | Contribution rate relative to ongoing expense<br>(set equal to Defined Benefit Component above) | 123% |
| 5. | **Recommended Allocation of Contribution to Plan [3] x [4]** | **14.24%** |

*Setting rates for year starting July 1

# Table 5 - Allocation of Plan Assets at Fair Value

| | Actual Allocation at January 1, 2023 | Target Allocation |
|---|---|---|
| 1. Global Equity | 37.7% | 38.0% |
| 2. Equity Long/Short | 6.7% | 6.0% |
| 3. Absolute Return | 9.7% | 9.0% |
| 4. Private Market | 32.0% | 31.0% |
| 5. Fixed Income | 14.0% | 15.0% |
| 6. Cash | -0.1% | 1.0% |
| | 100.0% | 100.0% |



# Table 6a - Reconciliation of Net Plan Assets (Combined)

| | | | Year Ending | |
|---|---|---|---|---|
| | | | December 31, 2022 | December 31, 2021 |
| 1. | Market value of assets at beginning of year | | $ 4,009,828,285 | $ 3,547,493,386 |
| 2. | Revenue for the year | | | |
| | a. | Contributions and Affiliations | | |
| | | i. Member contributions | $ 131,322,878 | $ 111,751,541 |
| | | ii. Employer contributions | 80,104,812 | 70,000,645 |
| | | iii. SWDD roll to normal contributions | 0 | 49,661 |
| | b. | Net investment income | | |
| | | i. Interest | $ 13,788,315 | $ 10,075,877 |
| | | ii. Dividends | 19,112,265 | 17,963,129 |
| | | iii. Net change in accrued income | 1,561,287 | (108,995) |
| | | iv. Unrealized gain/(loss) | (396,476,160) | 214,986,233 |
| | | v. Realized gain/(loss) | 58,039,195 | 290,494,240 |
| | | vi. Defined contribution earnings (net) | 0 | (2) |
| | | vii. Investment expense | (30,008,842) | (30,570,503) |
| | | viii. Other income | 9,684,512 | 11,301,616 |
| | c. | Total revenue | $ (112,871,738) | $ 695,943,442 |
| 3. | Expenditures for the year | | | |
| | a. | Refunds | $ (7,984,786) | $ (6,108,763) |
| | b. | Benefit payments | (112,683,766) | (222,856,534) |
| | c. | Administrative expense | (5,425,428) | (4,643,246) |
| | d. | Total expenditures | $ (126,093,980) | $ (233,608,543) |
| 4. | Change in net assets [2.c] + [3.d] | | $ (238,965,718) | $ 462,334,899 |
| 5. | Market value of assets at end of year [1] + [4] | | $ 3,770,862,567 | $ 4,009,828,285 |

# Table 6b - Reconciliation of Net Plan Assets
# (formerly Statewide Defined Benefit Plan)

| | | Year Ending | | | |
|---|---|---|---|---|---|
| | | December 31, 2022 | | December 31, 2021 | |
| 1. | Market value of assets at beginning of year | $ | 3,894,539,387 | $ | 3,447,586,098 |
| 2. | Revenue for the year | | | | |
| | a. Contributions and Affiliations | | | | |
| | i. Member contributions | $ | 128,390,461 | $ | 110,015,773 |
| | ii. Employer contributions | | 78,283,012 | | 68,304,906 |
| | iii. SWDD roll to normal contributions | | 0 | | 49,661 |
| | b. Net investment income | | | | |
| | i. Interest | $ | 13,392,000 | $ | 9,784,951 |
| | ii. Dividends | | 18,562,687 | | 17,444,640 |
| | iii. Net change in accrued income | | 1,516,112 | | (105,904) |
| | iv. Unrealized gain/(loss) | | (385,019,465) | | 208,782,975 |
| | v. Realized gain/(loss) | | 56,360,377 | | 282,104,560 |
| | vi. Defined contribution earnings (net) | | 0 | | (2) |
| | vii. Investment expense | | (29,145,816) | | (29,688,467) |
| | viii. Other income | | 9,407,400 | | 10,975,034 |
| | c. Total revenue | $ | (108,253,232) | $ | 677,668,127 |
| 3. | Expenditures for the year | | | | |
| | a. Refunds | $ | (7,984,786) | $ | (6,072,704) |
| | b. Benefit payments | | (109,673,995) | | (220,135,505) |
| | c. Administrative expense | | (5,279,313) | | (4,506,629) |
| | d. Total expenditures | $ | (122,938,094) | $ | (230,714,838) |
| 4. | Change in net assets [2.c] + [3.d] | $ | (231,191,326) | $ | 446,953,289 |
| 5. | Market value of assets at end of year [1] + [4] | $ | 3,663,348,061 | $ | 3,894,539,387 |

# Table 6c - Reconciliation of Net Plan Assets
# (formerly Statewide Hybrid Plan – Defined Benefit Component)

| | | | Year Ending | |
|---|---|---|---|---|
| | | | December 31, 2022 | December 31, 2021 |
| 1. | Market value of assets at beginning of year | | $ 115,288,898 | $ 99,907,288 |
| 2. | Revenue for the year | | | |
| | a. | Contributions and Affiliations | | |
| | | i. Member contributions | $ 2,932,417 | $ 1,735,768 |
| | | ii. Employer contributions | 1,821,800 | 1,695,739 |
| | | iii. SWDD roll to normal contributions | 0 | 0 |
| | b. | Net investment income | | |
| | | i. Interest | $ 396,315 | $ 290,926 |
| | | ii. Dividends | 549,578 | 518,489 |
| | | iii. Net change in accrued income | 45,175 | (3,091) |
| | | iv. Unrealized gain/(loss) | (11,456,695) | 6,203,258 |
| | | v. Realized gain/(loss) | 1,678,818 | 8,389,680 |
| | | vi. Defined contribution earnings (net) | 0 | 0 |
| | | vii. Investment expense | (863,026) | (882,036) |
| | | viii. Other income | 277,112 | 326,582 |
| | c. | Total revenue | $ (4,618,506) | $ 18,275,315 |
| 3. | Expenditures for the year | | | |
| | a. | Refunds | $ 0 | $ (36,059) |
| | b. | Benefit payments | (3,009,771) | (2,721,029) |
| | c. | Administrative expense | (146,115) | (136,617) |
| | d. | Total expenditures | $ (3,155,886) | $ (2,893,705) |
| 4. | Change in net assets [2.c] + [3.d] | | $ (7,774,392) | $ 15,381,610 |
| 5. | Market value of assets at end of year [1] + [4] | | $ 107,514,506 | $ 115,288,898 |

# Table 7 - Development of Actuarial Value of Assets

**Development of Actuarial Value of Assets**

| | | | |
|---|---|---|---|
| 1. | Actuarial value of assets at beginning of year | | $ 3,621,208,845 |
| 2. | Net new investments | | |
| | a. | Contributions and Affiliations | $ 211,427,690 |
| | b. | Benefits paid | (112,683,766) |
| | c. | Refunds | (7,984,786) |
| | d. | Administrative expenses | (5,425,428) |
| | e. | Subtotal | $ 85,333,710 |
| 3. | Assumed investment return rate for fiscal year | | 7.00% |
| 4. | Assumed investment return for fiscal year | | $ 256,471,299 |
| 5. | Expected Actuarial Value at end of year | | $ 3,963,013,854 |
| 6. | Market value of assets at end of year | | $ 3,770,862,567 |
| 7. | Excess return/(Shortfall) [6] - [5] | | $ (192,151,287) |

8. Development of amounts to be recognized as of January 1, 2023:

| Fiscal Year End | Remaining Deferrals of Excess/(Shortfall) of Investment Income | Offsetting of Gains/(Losses) | Net Deferrals Remaining | Years Remaining | Recognized for this valuation | Remaining after this valuation |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) = (1) + (2) | (4) | (5) = (3) / (4) | (6) = (3) - (5) |
| 2018 | $ 0 | $ 0 | $ 0 | 1 | $ 0 | $ 0 |
| 2019 | 38,682,749 | (38,682,749) | 0 | 2 | 0 | 0 |
| 2020 | 123,371,376 | (123,371,376) | 0 | 3 | 0 | 0 |
| 2021 | 226,565,315 | (226,565,315) | 0 | 4 | 0 | 0 |
| 2022 | (580,770,727) | 388,619,440 | (192,151,287) | 5 | (38,430,257) | (153,721,030) |
| Total | $ (192,151,287) | $ 0 | $ (192,151,287) | | $ (38,430,257) | $ (153,721,030) |

| | | |
|---|---|---|
| 9. | Actuarial value of assets as of January 1, 2023 [6] - [8] | $ 3,924,583,597 |
| 10. | Ratio of actuarial value to market value | 104.1% |

*Amounts in column (1) for fiscal years ending 2018 through 2021 are from the prior valuation. The column (1) amount for fiscal year 2022 is developed using item 7 less the total of column (1) for fiscal years ending 2018 through 2021. To the extent possible, the 2022 excess or shortfall is used to reduce prior bases. In this case, the 2022 shortfall was offset using the remaining excess bases from 2019 to 2021. The fiscal year 2018 bases is $0 because it was previously offset.*

# Table 8 - Investment Yields

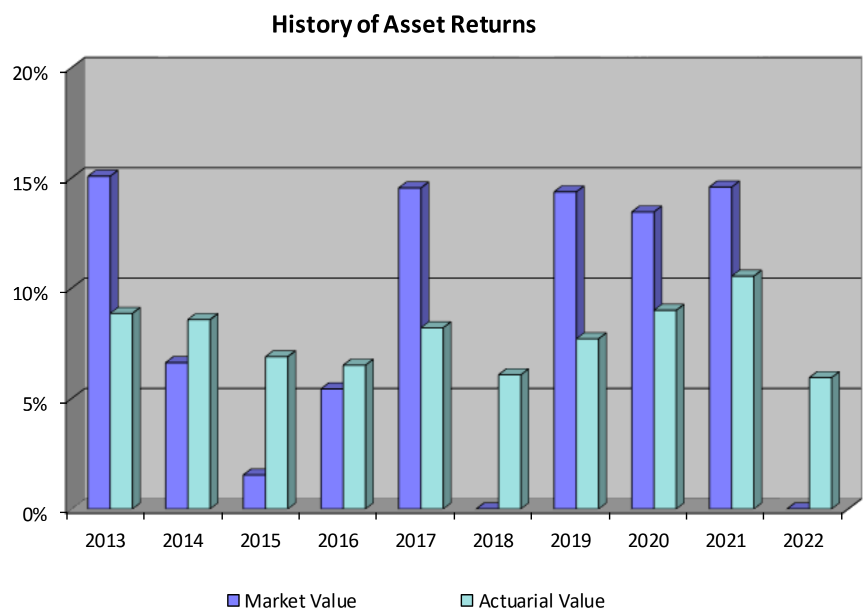
| Item | Market Value | Actuarial Value |
|---|---|---|
| 1. Assets as of January 1, 2022 (A) | $ 4,009,828,285 | $ 3,621,208,845 |
| 2. Contributions during FY22 | 211,427,690 | 211,427,690 |
| 3. Benefit payments made during FY22 | (112,683,766) | (112,683,766) |
| 4. Refunds of contributions during FY22 | (7,984,786) | (7,984,786) |
| 5. Administrative expenses during FY22 | (5,425,428) | (5,425,428) |
| 6. Investment return during FY22 | (324,299,428) | 218,041,042 |
| 7. Assets as of January 1, 2023 (B): [1] + [2] + [3] + [4] + [5] + [6] | $ 3,770,862,567 | $ 3,924,583,597 |
| 8. Approximate rate of return on average invested assets | | |
| a. Net investment income (I) | $ (324,299,428) | $ 218,041,042 |
| b. Estimated return based on (2I / (A + B - I)) | (8.00%) | 5.95% |

# Table 9 - Gain/(Loss) on Actuarial Value of Assets

| Item | Valuation as of January 1, 2023 | Valuation as of January 1, 2022 |
|---|---|---|
| 1. Actuarial assets, prior valuation | $ 3,621,208,845 | $ 3,324,974,094 |
| 2. Total contributions since prior valuation | $ 211,427,690 | $ 181,801,847 |
| 3. Benefits, refunds, and administrative expense since prior valuation | $ (126,093,980) | $ (233,608,543) |
| 4. Assumed net investment income at actuarial rate% | | |
| a. Beginning assets | $ 253,484,619 | $ 232,748,187 |
| b. Contributions | 7,399,969 | 6,363,065 |
| c. Benefits, refunds paid, and administrative expense | (4,413,289) | (8,176,299) |
| d. Total | $ 256,471,299 | $ 230,934,953 |
| 5. Expected actuarial assets [1] + [2] + [3] + [4] | $ 3,963,013,854 | $ 3,504,102,351 |
| 6. Actual actuarial assets, this valuation | $ 3,924,583,597 | $ 3,621,208,845 |
| 7. Asset gain/(loss) [6] - [5] | $ (38,430,257) | $ 117,106,494 |

# Table 10 - History of Investment Return Rates

| For Fiscal Year Ending | Market Value | Actuarial Value |
|---|---|---|
| (1) | (2) | (3) |
| December 31, 2013 | 15.08% | 8.86% |
| December 31, 2014 | 6.63% | 8.58% |
| December 31, 2015 | 1.54% | 6.90% |
| December 31, 2016 | 5.44% | 6.51% |
| December 31, 2017 | 14.55% | 8.21% |
| December 31, 2018 | (0.09%) | 6.08% |
| December 31, 2019 | 14.37% | 7.71% |
| December 31, 2020 | 13.46% | 9.00% |
| December 31, 2021 | 14.59% | 10.55% |
| December 31, 2022 | (8.00%) | 5.95% |
| Average Returns: | | |
| Last 5 Years | 6.5% | 7.8% |
| Last 10 Years | 7.5% | 7.8% |




Note: Amounts for 2021 and earlier reflect the experience of the former Statewide Defined Benefit Plan. Although similar, experience of the former Statewide Hybrid Plan – Defined Benefit Component was slightly different due to differences in cash flow timing.

# Table 11a - Schedule of Funding Progress
# Base Benefits Only (Assumed COLA = 0.0%)

| Date | Actuarial Value of Assets (AVA) | Actuarial Accrued Liability (AAL) | Unfunded Actuarial Accrued Liability (UAAL) (3) - (2) | Funded Ratio (2)/(3) | Annual Payroll | UAAL as % of Payroll (4)/(6) |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| January 1, 2014 | 1,546,834,469 | 1,533,631,141 | (13,203,328) | 100.9% | 426,690,241 | (3.1%) |
| January 1, 2015 | 1,714,971,185 | 1,652,901,084 | (62,070,101) | 103.8% | 441,313,862 | (14.1%) |
| January 1, 2016 | 1,890,604,068 | 1,846,961,999 | (43,642,069) | 102.4% | 473,359,565 | (9.2%) |
| January 1, 2017 | 2,050,113,711 | 2,021,526,883 | (28,586,828) | 101.4% | 513,837,288 | (5.6%) |
| January 1, 2018 | 2,353,241,861 | 2,269,410,684 | (83,831,177) | 103.7% | 577,624,013 | (14.5%) |
| January 1, 2019 | 2,615,483,150 | 2,653,120,261 | 37,637,111 | 98.6% | 659,583,375 | 5.7% |
| January 1, 2020 | 2,900,630,940 | 2,972,018,080 | 71,387,140 | 97.6% | 729,345,875 | 9.8% |
| January 1, 2021 | 3,231,270,532 | 3,230,485,701 | (784,831) | 100.0% | 772,364,866 | (0.1%) |
| January 1, 2022 | 3,517,056,495 | 3,352,605,624 | (164,450,871) | 104.9% | 801,386,280 | (20.5%) |
| January 1, 2023 | 3,924,583,597 | 3,858,165,088 | (66,418,509) | 101.7% | 911,151,336 | (7.3%) |

Note: Amounts for 2022 and earlier reflect the former Statewide Defined Benefit Plan.

***Limitations of Funded Status Measurements***

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. With regard to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan’s benefit obligations.
(2) The measurement alone is inappropriate for assessing the need for or the amount of future employer contributions.
(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

# Table 11b - Schedule of Funding Progress
# Including Long-Term COLA Assumption (Assumed COLA = 2.50% per year)

| Date | Actuarial Value of Assets (AVA) | Actuarial Accrued Liability (AAL) | Unfunded Actuarial Accrued Liability (UAAL) (3) - (2) | Funded Ratio (2)/(3) | Annual Payroll | UAAL as % of Payroll (4)/(6) |
|---|---|---|---|---|---|---|
| (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| January 1, 2023 | 3,924,583,597 | 4,982,405,046 | 1,057,821,449 | 78.8% | 911,151,336 | 116.1% |

***Limitations of Funded Status Measurements***

Unless otherwise indicated, a funded status measurement presented in this report is based upon the actuarial accrued liability and the actuarial value of assets. With regard to any funded status measurements presented in this report:

(1) The measurement is inappropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations.
(2) The measurement alone is inappropriate for assessing the need for or the amount of future employer contributions.
(3) The measurement would produce a different result if the market value of assets were used instead of the actuarial value of assets, unless the market value of assets is used in the measurement.

# Table 12 - Solvency Test
## Base Benefits Only

| | Aggregated Accrued Liabilities for | | | | Portion of Accrued Liabilities Covered by Reported Assets | | |
|---|---|---|---|---|---|---|---|
| Valuation Date | Active Members Contributions | Retirees Beneficiaries and Vested Terminations | Members (Employer Financed Portion) | Actuarial Value of Assets | (5)/(2) | [(5)-(2)]/(3) | [(5)-(2)-(3)]/(4) |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| January 1, 2023 | 824,260 | 1,601,848 | 1,498,476 | 3,924,584 | 100.0% | 100.0% | 100.0% |

$ amounts in ‘000s

# Table 13 - Cash Flow Analysis

| Year Ending December 31, (1) | Contributions for the Year (2) | Expenditures During the Year: Benefit Payments (3) | Refund of Contributions (4) | Identified Receipts (5) | Expenses (6) | Total (7) | External Cash Flow for the Year (8) | Market Value of Assets (9) | External Cash Flow as Percent of Market Value (10) |
|---|---|---|---|---|---|---|---|---|---|
| 2013 | $ 93,538 | $ (42,443) | $ (2,796) | $ 0 | $ (14,401) | $ (59,639) | $ 33,899 | $ 1,623,050 | 2.1% |
| 2014 | 83,472 | (47,701) | (1,849) | 0 | (15,647) | (65,196) | 18,276 | 1,765,759 | 1.0% |
| 2015 | 110,242 | (53,076) | (1,763) | 0 | (1,854) | (56,694) | 53,548 | 1,848,725 | 2.9% |
| 2016 | 100,379 | (59,989) | (1,813) | 0 | (3,384) | (65,186) | 35,192 | 1,985,393 | 1.8% |
| 2017 | 200,793 | (65,965) | (2,188) | 0 | (3,136) | (71,288) | 129,505 | 2,413,276 | 5.4% |
| 2018 | 199,491 | (77,194) | (3,406) | 0 | (3,227) | (83,828) | 115,664 | 2,526,693 | 4.6% |
| 2019 | 170,971 | (83,822) | (3,200) | 0 | (3,525) | (90,547) | 80,423 | 2,975,935 | 2.7% |
| 2020 | 169,250 | (94,475) | (4,259) | 0 | (4,032) | (102,767) | 66,483 | 3,447,586 | 1.9% |
| 2021 | 178,370 | (220,136) | (6,073) | 0 | (4,507) | (230,715) | (52,344) | 3,894,539 | -1.3% |
| 2022 | 211,428 | (112,684) | (7,985) | 0 | (5,425) | (126,094) | 85,334 | 3,770,863 | 2.3% |
| 2023 * | 198,662 | (150,326) | (9,671) | 0 | (5,588) | (165,585) | 33,077 | 4,069,058 | 0.8% |
| 2024 * | 209,381 | (159,413) | (9,961) | 0 | (5,756) | (175,129) | 34,251 | 4,389,342 | 0.8% |
| 2025 * | 220,563 | (177,047) | (10,259) | 0 | (5,929) | (193,235) | 27,329 | 4,724,881 | 0.6% |

* Results for 2023, 2024, & 2025 are based on expected contributions, expected benefit payments, and assumed investment return of 7.00%.
Expected contributions are based on a blended combined employee and employer rate of 21.29%/21.79%/22.28% and 3.00% annual payroll growth for 2023/2024/2025, respectively.
Expected benefit payments are based on current plan benefits and expected retirements, terminations, and mortality.
Assets are assumed to increase at the annual return of 7.00% with all cash flow occurring in the middle of the year.

$ amounts in '000s

Note: Amounts for 2022 and earlier reflect the combined experience of the former Statewide Defined Benefit Plan and the Statewide Hybrid Plan – Defined Benefit Component.

# Table 14 - Membership Data

| | January 1, 2023 | January 1, 2022 | January 1, 2021 |
|---|---|---|---|
| 1. Active members | | | |
| *Defined Benefit Component* | | | |
| a. Number | 9,721 | 9,214 | 9,008 |
| b. Total payroll | $ 886,861,361 | $ 793,432,935 | $ 764,843,701 |
| c. Average annual salary | $ 91,231 | $ 86,112 | $ 84,907 |
| d. Average age | 39.7 | 39.9 | 40.1 |
| e. Average service | 9.6 | 9.8 | 10.0 |
| *Hybrid Component* | | | |
| a. Number | 187 | 192 | 188 |
| b. Total payroll | $ 18,575,043 | $ 17,913,196 | $ 17,260,110 |
| c. Average annual salary | $ 99,332 | $ 93,298 | $ 91,809 |
| d. Average age | 45.0 | 44.3 | 45.5 |
| e. Average service | 13.3 | 12.8 | 13.8 |
| *Defined Benefit - Social Security Component* | | | |
| a. Number | 78 | 119 | 108 |
| b. Total payroll | $ 5,714,932 | $ 7,953,345 | $ 7,521,165 |
| c. Average annual salary | $ 73,268 | $ 66,835 | $ 69,640 |
| d. Average age | 38.0 | 38.2 | 38.9 |
| e. Average service | 4.9 | 4.8 | 5.6 |
| Total | | | |
| a. Number | 9,986 | 9,525 | 9,304 |
| b. Total payroll | $ 911,151,336 | $ 819,299,476 | $ 789,624,976 |
| c. Average annual salary | $ 91,243 | $ 86,016 | $ 84,869 |
| d. Average age | 39.8 | 40.0 | 40.2 |
| e. Average service | 9.6 | 9.8 | 10.1 |
| 2. Inactive members | | | |
| a. Vested | 314 | 311 | 288 |
| b. NonVested * | 1,725 | 1,423 | 1,187 |
| 3. Service retirees | | | |
| a. Number | 2,331 | 2,153 | 1,867 |
| b. Total annual benefits | $ 117,222,006 | $ 105,848,869 | $ 88,228,775 |
| c. Average annual benefit | $ 50,288 | $ 49,163 | $ 47,257 |
| d. Average age | 64.5 | 64.1 | 64.2 |
| 4. Beneficiaries and spouses | | | |
| a. Number | 158 | 142 | 116 |
| b. Total annual benefits | $ 3,774,291 | $ 3,145,495 | $ 2,561,352 |
| c. Average annual benefit | $ 23,888 | $ 22,151 | $ 22,081 |
| d. Average age | 62.1 | 61.2 | 60.8 |

* Includes members who have terminated and could elect a deferred benefit, but have not yet been processed

Note: Amounts for 2022 and earlier reflect the combined experience of the former Statewide Defined Benefit Plan and The Statewide Hybrid Plan – Defined Benefit Component.

## Table 15 - Historical Summary of Active Member Data

| Valuation Date | Active Count | Average Age | Average Service | Covered Payroll | Average Annual Salary | Percent Change in Average Salary |
|---|---|---|---|---|---|---|
| 2014 | 6,280 | 40.9 | 10.6 | 439,628,032 | 70,004 | -0.16% |
| 2015 | 6,401 | 41.0 | 10.7 | 453,454,046 | 70,841 | 1.20% |
| 2016 | 6,762 | 40.9 | 10.6 | 486,190,306 | 71,900 | 1.50% |
| 2017 | 7,050 | 40.8 | 10.5 | 526,344,234 | 74,659 | 3.84% |
| 2018 | 7,775 | 40.6 | 10.4 | 592,682,062 | 76,229 | 2.10% |
| 2019 | 8,572 | 40.3 | 10.2 | 675,035,150 | 78,749 | 3.31% |
| 2020 | 9,133 | 40.1 | 10.1 | 745,690,012 | 81,648 | 3.68% |
| 2021 | 9,304 | 40.2 | 10.1 | 789,624,976 | 84,869 | 3.95% |
| 2022 | 9,525 | 40.0 | 9.8 | 819,299,476 | 86,016 | 1.35% |
| 2023 | 9,986 | 39.8 | 9.6 | 911,151,336 | 91,243 | 6.08% |

Note: Amounts for 2022 and earlier reflect the combined experience of the former Statewide Defined Benefit Plan and The Statewide Hybrid Plan – Defined Benefit Component.

# Table 16 - Distribution of Active Members by Age and by Years of Service
# As of December 31, 2022

| Attained Age | Less than 1 Count & Avg. Comp. | 1-2 Count & Avg. Comp. | 2-3 Count & Avg. Comp. | 3-4 Count & Avg. Comp. | 4-5 Count & Avg. Comp. | 5-9 Count & Avg. Comp. | 10-14 Count & Avg. Comp. | 15-19 Count & Avg. Comp. | 20-24 Count & Avg. Comp. | 25-29 Count & Avg. Comp. | 30-34 Count & Avg. Comp. | 35 & Over Count & Avg. Comp. | Total Count & Avg. Comp. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Years of Credited Service | | | | | | | | | | | | |
| Under 25 | 177 | 89 | 28 | 11 | 2 | | | | | | | | 307 |
| | $58,154 | $60,038 | $65,920 | $72,837 | $67,195 | | | | | | | | $60,017 |
| 25-29 | 376 | 276 | 156 | 195 | 131 | 149 | | | | | | | 1,283 |
| | $60,229 | $66,004 | $70,935 | $76,444 | $81,804 | $85,600 | | | | | | | $70,387 |
| 30-34 | 300 | 187 | 169 | 243 | 205 | 662 | 70 | 2 | | | | | 1,838 |
| | $63,370 | $69,418 | $72,364 | $81,217 | $86,783 | $92,838 | $96,656 | $117,640 | | | | | $81,724 |
| 35-39 | 173 | 109 | 104 | 152 | 148 | 699 | 312 | 123 | 3 | | | | 1,823 |
| | $64,251 | $67,449 | $71,926 | $80,775 | $83,726 | $94,786 | $100,248 | $107,511 | $110,170 | | | | $88,702 |
| 40-44 | 89 | 54 | 59 | 61 | 55 | 337 | 321 | 420 | 98 | 4 | | | 1,498 |
| | $64,028 | $72,547 | $72,792 | $83,412 | $86,910 | $95,856 | $101,970 | $108,903 | $116,839 | $128,529 | | | $97,809 |
| 45-49 | 43 | 40 | 23 | 35 | 29 | 180 | 173 | 348 | 349 | 67 | 3 | | 1,290 |
| | $65,126 | $79,908 | $80,568 | $79,134 | $78,183 | $96,352 | $100,047 | $107,541 | $115,193 | $119,291 | $150,093 | | $103,572 |
| 50-54 | 30 | 22 | 17 | 19 | 21 | 94 | 138 | 263 | 380 | 252 | 27 | 1 | 1,264 |
| | $65,124 | $81,907 | $77,200 | $79,944 | $84,479 | $96,415 | $100,351 | $107,578 | $113,945 | $118,498 | $125,442 | $100,701 | $107,764 |
| 55-59 | 13 | 13 | 19 | 6 | 9 | 42 | 52 | 112 | 140 | 73 | 31 | 2 | 512 |
| | $76,366 | $74,714 | $91,961 | $102,240 | $83,316 | $98,948 | $104,657 | $106,459 | $113,479 | $127,679 | $131,473 | $114,213 | $109,585 |
| 60-64 | 6 | 8 | 6 | 4 | 5 | 13 | 12 | 28 | 22 | 14 | 10 | 5 | 133 |
| | $88,418 | $102,099 | $66,106 | $117,678 | $82,618 | $98,558 | $109,629 | $102,325 | $121,073 | $108,992 | $112,615 | $125,397 | $105,506 |
| 65 & Over | 2 | | 1 | 2 | 2 | 6 | 5 | 9 | 6 | 1 | 3 | 1 | 38 |
| | $62,371 | | $81,992 | $77,083 | $106,721 | $95,238 | $105,396 | $113,191 | $103,387 | $89,107 | $156,624 | $164,296 | $106,186 |
| Total | 1,209 | 798 | 582 | 728 | 607 | 2,182 | 1,083 | 1,305 | 998 | 411 | 74 | 9 | 9,986 |
| | $62,172 | $68,418 | $72,693 | $80,133 | $84,399 | $94,036 | $100,846 | $107,834 | $114,682 | $119,960 | $128,499 | $124,490 | $91,243 |

| | | | | | |
|---|---|---|---|---|---|
| Average: | Age: | 39.8 | Number of participants: | Males: | 8,794 |
| | Service: | 9.6 | | Females: | 1,192 |

# Table 17 - Schedule of Retirants and Annuitants Added to and Removed from Rolls*

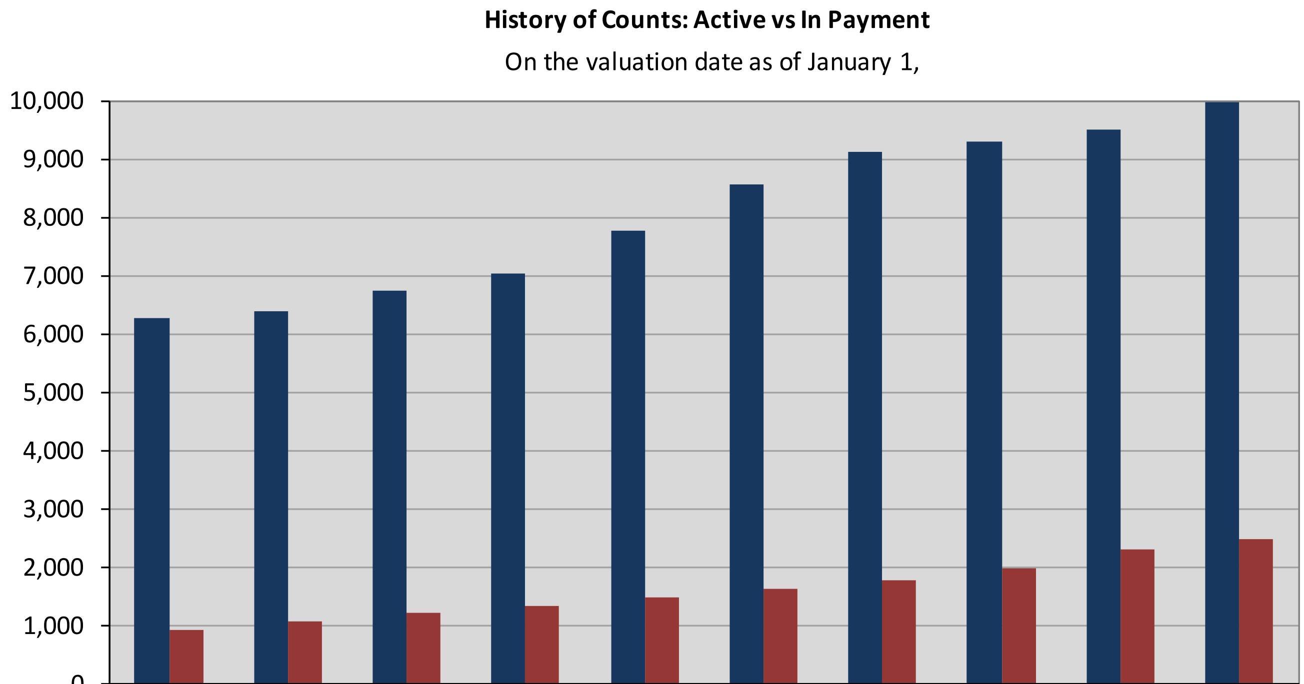
| | Added to Rolls** | | Removed from Rolls | | Rolls-End of Year | | | |
|---|---|---|---|---|---|---|---|---|
| Year Ended | Number | Annual Benefits | Number | Annual Benefits | Number | Annual Benefits | % Increase in Annual Benefits | Average Annual Benefits |
| (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) | (9) |
| December 31, 2013 | 158 | 7,639,919 | 2 | 81,763 | 927 | 36,351,630 | 26.25% | 39,214 |
| December 31, 2014 | 152 | 6,624,569 | 5 | 121,694 | 1,074 | 42,854,504 | 17.89% | 39,902 |
| December 31, 2015 | 140 | 6,689,379 | 5 | 120,311 | 1,209 | 49,423,572 | 15.33% | 40,880 |
| December 31, 2016 | 137 | 6,942,172 | 5 | 138,121 | 1,341 | 56,227,623 | 13.77% | 41,930 |
| December 31, 2017 | 143 | 6,881,672 | 7 | 292,551 | 1,477 | 62,816,744 | 11.72% | 42,530 |
| December 31, 2018 | 176 | 9,087,814 | 11 | 393,695 | 1,642 | 71,510,863 | 13.84% | 43,551 |
| December 31, 2019 | 156 | 7,892,310 | 12 | 347,834 | 1,786 | 79,055,339 | 10.55% | 44,264 |
| December 31, 2020 | 221 | 12,735,141 | 24 | 1,000,353 | 1,983 | 90,790,128 | 14.84% | 45,784 |
| December 31, 2021 | 328 | 18,685,025 | 16 | 480,789 | 2,295 | 108,994,364 | 20.05% | 47,492 |
| December 31, 2022 | 218 | 12,856,674 | 24 | 854,741 | 2,489 | 120,996,297 | 11.01% | 48,612 |

**Includes beneficiaries of deceased members with a deferred benefit.*

***Includes cost-of-living adjustments*

Note: Amounts for 2022 and earlier reflect the combined experience of the former Statewide Defined Benefit Plan and The Statewide Hybrid Plan – Defined Benefit Component.

# Table 18 – Comparison of Active and Annuitant Counts




| | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 | 2023 |
|---|---|---|---|---|---|---|---|---|---|---|
| Actives | 6,280 | 6,401 | 6,762 | 7,050 | 7,775 | 8,572 | 9,133 | 9,304 | 9,525 | 9,986 |
| In Payment | 927 | 1,074 | 1,209 | 1,341 | 1,477 | 1,642 | 1,786 | 1,983 | 2,295 | 2,489 |

In comparison to its public sector peers, the Statewide Retirement Plan could be considered a "young" plan as the Plan's liabilities are still largely attributable to active members and are comparably small in relation to the active member payroll. Historically, in addition to new hires and wage inflation, the FPPA Statewide Retirement Plan membership has grown through additional affiliations (reentry groups). This potential pool of public safety employer reentry candidates is diminishing, and it is unlikely that this will continue at the historical rate.

# Table 19 - Summary of Members and Adjusted Payroll by Employer

| City Code | City Name | Police No. | Police Earnings | Fire No. | Fire Earnings | Total No. | Total Earnings |
|---|---|---|---|---|---|---|---|
| 550 | ADAMS COUNTY | 0 | $ 0 | 98 | $ 9,969,396 | 98 | $ 9,969,396 |
| 501 | ARVADA FPD | 0 | 0 | 167 | 17,280,763 | 167 | 17,280,763 |
| 711 | ASPEN FPD | 0 | 0 | 18 | 1,589,498 | 18 | 1,589,498 |
| 9 | AULT | 8 | 458,294 | 0 | 0 | 8 | 458,294 |
| 712 | AULT FPD | 0 | 0 | 7 | 352,507 | 7 | 352,507 |
| 10 | AURORA | 0 | 0 | 435 | 40,482,950 | 435 | 40,482,950 |
| 12 | BASALT | 9 | 790,025 | 0 | 0 | 9 | 790,025 |
| 13 | BAYFIELD | 7 | 410,012 | 0 | 0 | 7 | 410,012 |
| 718 | BENNETT FPD #7 | 0 | 0 | 29 | 1,779,966 | 29 | 1,779,966 |
| 503 | BERTHOUD FPD | 0 | 0 | 33 | 2,795,804 | 33 | 2,795,804 |
| 538 | BEULAH FIRE PROTECTION & AMBULANCE | 0 | 0 | 2 | 102,771 | 2 | 102,771 |
| 7331 | BIG SANDY FPD | 0 | 0 | 1 | 43,627 | 1 | 43,627 |
| 580 | BLACK FOREST RESCUE | 0 | 0 | 28 | 1,875,340 | 28 | 1,875,340 |
| 723 | BLACK HAWK | 0 | 0 | 22 | 1,997,518 | 22 | 1,997,518 |
| 18 | BLANCA | 3 | 127,599 | 0 | 0 | 3 | 127,599 |
| 726 | BOULDER MOUNTAIN AUTH | 0 | 0 | 6 | 380,699 | 6 | 380,699 |
| 730 | BOULDER RURAL FPD | 0 | 0 | 20 | 1,970,425 | 20 | 1,970,425 |
| 7700 | BRIGGSDALE FPD | 0 | 0 | 1 | 56,000 | 1 | 56,000 |
| 326 | BRIGHTON | 71 | 6,297,572 | 0 | 0 | 71 | 6,297,572 |
| 26 | BRIGHTON (GREATER) FPD | 0 | 0 | 76 | 7,610,557 | 76 | 7,610,557 |
| 504 | BROADMOOR FPD | 0 | 0 | 4 | 409,889 | 4 | 409,889 |
| 27 | BROOMFIELD | 157 | 14,959,884 | 0 | 0 | 157 | 14,959,884 |
| 28 | BRUSH | 8 | 490,239 | 0 | 0 | 8 | 490,239 |
| 29 | BUENA VISTA | 12 | 760,073 | 0 | 0 | 12 | 760,073 |
| 735 | BYERS FPD #9 | 0 | 0 | 4 | 215,167 | 4 | 215,167 |
| 736 | CALHAN FPD | 0 | 0 | 6 | 311,372 | 6 | 311,372 |
| 33 | CANON CITY | 36 | 2,362,370 | 0 | 0 | 36 | 2,362,370 |
| 740 | CARBONDALE AND RURAL FPD | 0 | 0 | 28 | 2,605,764 | 28 | 2,605,764 |
| 35 | CASTLE ROCK | 78 | 7,597,760 | 93 | 9,660,827 | 171 | 17,258,587 |
| 37 | CENTER | 8 | 355,001 | 0 | 0 | 8 | 355,001 |

# Table 19 (continued) - Summary of Members and Adjusted Payroll by Employer

| City Code | City Name | Police No. | Police Earnings | Fire No. | Fire Earnings | Total No. | Total Earnings |
|---|---|---|---|---|---|---|---|
| 1748 | CENTRAL ORCHARD MESA FPD | 0 | $ 0 | 1 | $ 47,996 | 1 | $ 47,996 |
| 749 | CHAFFEE COUNTY FPD | 0 | 0 | 8 | 458,212 | 8 | 458,212 |
| 754 | CIMARRON HILLS FPD | 0 | 0 | 28 | 2,049,084 | 28 | 2,049,084 |
| 7125 | CLEAR CREEK AUTHORITY | 0 | 0 | 9 | 520,242 | 9 | 520,242 |
| 509 | CLIFTON FPD | 0 | 0 | 19 | 1,168,259 | 19 | 1,168,259 |
| 757 | COAL CREEK CANYON FPD | 0 | 0 | 1 | 83,500 | 1 | 83,500 |
| 44 | COLLBRAN | 1 | 45,943 | 0 | 0 | 1 | 45,943 |
| 531 | COLORADO RIVER FRA | 0 | 0 | 45 | 3,875,545 | 45 | 3,875,545 |
| 45 | COLORADO SPRINGS | 548 | 45,997,388 | 383 | 36,363,504 | 931 | 82,360,893 |
| 46 | COLUMBINE VALLEY | 6 | 465,663 | 0 | 0 | 6 | 465,663 |
| 765 | CORTEZ FPD | 0 | 0 | 18 | 778,156 | 18 | 778,156 |
| 772 | CRESTED BUTTE FPD | 0 | 0 | 21 | 1,670,614 | 21 | 1,670,614 |
| 774 | CRIPPLE CREEK | 0 | 0 | 11 | 788,191 | 11 | 788,191 |
| 57 | DACONO | 13 | 1,176,564 | 0 | 0 | 13 | 1,176,564 |
| 58 | DEBEQUE | 4 | 271,820 | 0 | 0 | 4 | 271,820 |
| 779 | DEBEQUE FPD | 0 | 0 | 10 | 696,872 | 10 | 696,872 |
| 783 | DELTA COUNTY FPD #1 | 0 | 0 | 1 | 54,399 | 1 | 54,399 |
| 62 | DENVER | 1,374 | 141,574,579 | 1,004 | 103,459,035 | 2,378 | 245,033,614 |
| 63 | DILLON | 11 | 983,840 | 0 | 0 | 11 | 983,840 |
| 64 | DINOSAUR | 2 | 121,800 | 0 | 0 | 2 | 121,800 |
| 567 | DURANGO & RESCUE AUTH | 0 | 0 | 76 | 5,827,689 | 76 | 5,827,689 |
| 507 | EAST GRAND FPD #4 | 0 | 0 | 6 | 418,547 | 6 | 418,547 |
| 795 | EATON FPD | 0 | 0 | 22 | 1,589,117 | 22 | 1,589,117 |
| 73 | EDGEWATER | 17 | 1,306,692 | 0 | 0 | 17 | 1,306,692 |
| 74 | ELIZABETH | 9 | 585,867 | 0 | 0 | 9 | 585,867 |
| 515 | ELIZABETH FPD | 0 | 0 | 24 | 1,726,979 | 24 | 1,726,979 |
| 7102 | ELK CREEK FPD | 0 | 0 | 22 | 1,379,104 | 22 | 1,379,104 |
| 75 | EMPIRE | 3 | 177,155 | 0 | 0 | 3 | 177,155 |
| 76 | ENGLEWOOD | 63 | 6,205,102 | 0 | 0 | 63 | 6,205,102 |
| 77 | ERIE | 46 | 4,490,267 | 0 | 0 | 46 | 4,490,267 |
| 523 | ESTES VALLEY FPD | 0 | 0 | 5 | 476,212 | 5 | 476,212 |
| 79 | EVANS | 33 | 2,968,278 | 0 | 0 | 33 | 2,968,278 |

# Table 19 (continued) - Summary of Members and Adjusted Payroll by Employer

| City Code | City Name | Police No. | Police Earnings | Fire No. | Fire Earnings | Total No. | Total Earnings |
|---|---|---|---|---|---|---|---|
| 579 | EVANS FPD | 0 | $ 0 | 21 | $ 1,781,924 | 21 | $ 1,781,924 |
| 7109 | EVERGREEN FPD | 0 | 0 | 5 | 414,026 | 5 | 414,026 |
| 510 | FAIRMOUNT FPD | 0 | 0 | 27 | 2,221,454 | 27 | 2,221,454 |
| 80 | FAIRPLAY MARSHALLS | 4 | 234,224 | 0 | 0 | 4 | 234,224 |
| 7112 | FALCON FPD | 0 | 0 | 58 | 4,162,455 | 58 | 4,162,455 |
| 81 | FEDERAL HEIGHTS | 23 | 1,954,183 | 13 | 1,063,631 | 36 | 3,017,814 |
| 82 | FIRESTONE | 31 | 3,061,797 | 0 | 0 | 31 | 3,061,797 |
| 85 | FLORENCE | 9 | 448,747 | 0 | 0 | 9 | 448,747 |
| 7118 | FLORISSANT FPD | 0 | 0 | 1 | 89,250 | 1 | 89,250 |
| 7222 | FOOTHILLS & RESCUE | 0 | 0 | 5 | 393,925 | 5 | 393,925 |
| 7122 | FORT LEWIS-MESA FPD | 0 | 0 | 2 | 148,053 | 2 | 148,053 |
| 7123 | FORT LUPTON FPD | 0 | 0 | 41 | 3,139,291 | 41 | 3,139,291 |
| 89 | FOUNTAIN | 58 | 4,348,400 | 42 | 2,970,525 | 100 | 7,318,925 |
| 7449 | FOUR MILE FPD | 0 | 0 | 6 | 323,236 | 6 | 323,236 |
| 90 | FOWLER | 4 | 149,949 | 0 | 0 | 4 | 149,949 |
| 511 | FRANKTOWN FPD | 0 | 0 | 22 | 1,511,369 | 22 | 1,511,369 |
| 292 | FREDERICK | 31 | 3,075,395 | 0 | 0 | 31 | 3,075,395 |
| 592 | FREDERICK FIRESTONE FPD | 0 | 0 | 71 | 6,038,767 | 71 | 6,038,767 |
| 93 | FRISCO | 9 | 817,665 | 0 | 0 | 9 | 817,665 |
| 7131 | FRONT RANGE FIRE RESCUE FPD | 0 | 0 | 32 | 2,920,948 | 32 | 2,920,948 |
| 7132 | GALETON FPD | 0 | 0 | 4 | 315,000 | 4 | 315,000 |
| 95 | GARDEN CITY | 5 | 342,216 | 0 | 0 | 5 | 342,216 |
| 7135 | GATEWAY-UNAWEEP FPD | 0 | 0 | 1 | 72,251 | 1 | 72,251 |
| 7136 | GENESEE FPD | 0 | 0 | 3 | 259,643 | 3 | 259,643 |
| 97 | GEORGETOWN | 2 | 174,976 | 0 | 0 | 2 | 174,976 |
| 102 | GRANADA | 1 | 52,799 | 0 | 0 | 1 | 52,799 |
| 7147 | GRAND FPD #1 | 0 | 0 | 5 | 315,019 | 5 | 315,019 |
| 104 | GRAND JUNCTION | 0 | 0 | 144 | 11,434,655 | 144 | 11,434,655 |
| 7149 | GRAND LAKE FPD | 0 | 0 | 13 | 884,709 | 13 | 884,709 |
| 7150 | GRAND VALLEY FPD | 0 | 0 | 14 | 1,321,659 | 14 | 1,321,659 |
| 7153 | GREATER EAGLE FPD | 0 | 0 | 16 | 1,129,760 | 16 | 1,129,760 |
| 107 | GREELEY | 0 | 0 | 125 | 11,702,782 | 125 | 11,702,782 |

## Table 19 (continued) - Summary of Members and Adjusted Payroll by Employer

| City Code | City Name | Police No. | Police Earnings | Fire No. | Fire Earnings | Total No. | Total Earnings |
|---|---|---|---|---|---|---|---|
| 7156 | GYPSUM FPD | 0 | $ 0 | 11 | $ 843,219 | 11 | $ 843,219 |
| 7158 | HARTSEL FPD | 0 | 0 | 2 | 126,856 | 2 | 126,856 |
| 115 | HAXTUN | 2 | 99,461 | 0 | 0 | 2 | 99,461 |
| 119 | HOLYOKE | 5 | 238,175 | 0 | 0 | 5 | 238,175 |
| 7174 | HOT SULPHUR SPRINGS/PARSHALL FPD | 0 | 0 | 1 | 73,600 | 1 | 73,600 |
| 7176 | HUDSON FPD | 0 | 0 | 25 | 2,195,339 | 25 | 2,195,339 |
| 123 | HUDSON MARSHAL | 11 | 855,065 | 0 | 0 | 11 | 855,065 |
| 124 | HUGO | 3 | 148,800 | 0 | 0 | 3 | 148,800 |
| 125 | IDAHO SPRINGS | 7 | 511,445 | 0 | 0 | 7 | 511,445 |
| 126 | IGNACIO | 8 | 552,115 | 0 | 0 | 8 | 552,115 |
| 7187 | INTER-CANYON FPD | 0 | 0 | 4 | 304,226 | 4 | 304,226 |
| 7191 | JEFFERSON-COMO FPD | 0 | 0 | 7 | 414,891 | 7 | 414,891 |
| 129 | JOHNSTOWN | 24 | 2,007,420 | 0 | 0 | 24 | 2,007,420 |
| 131 | KEENESBURG | 6 | 432,447 | 0 | 0 | 6 | 432,447 |
| 132 | KERSEY | 5 | 382,917 | 0 | 0 | 5 | 382,917 |
| 7198 | KIOWA FPD | 0 | 0 | 3 | 148,529 | 3 | 148,529 |
| 136 | KREMMLING | 2 | 163,835 | 0 | 0 | 2 | 163,835 |
| 5136 | KREMMLING FPD | 0 | 0 | 2 | 108,525 | 2 | 108,525 |
| 138 | LA JARA | 3 | 142,775 | 0 | 0 | 3 | 142,775 |
| 144 | LA SALLE | 7 | 459,810 | 0 | 0 | 7 | 459,810 |
| 7211 | LA SALLE FPD | 0 | 0 | 15 | 1,128,369 | 15 | 1,128,369 |
| 146 | LA VETA | 1 | 54,000 | 0 | 0 | 1 | 54,000 |
| 137 | LAFAYETTE | 41 | 3,766,591 | 38 | 3,669,804 | 79 | 7,436,395 |
| 7206 | LAKE GEORGE FPD | 0 | 0 | 2 | 98,158 | 2 | 98,158 |
| 593 | LAKE DILLON FPD | 0 | 0 | 71 | 5,911,002 | 71 | 5,911,002 |
| 263 | LAKESIDE | 11 | 769,640 | 0 | 0 | 11 | 769,640 |
| 141 | LARKSPUR FPD | 0 | 0 | 17 | 1,181,615 | 17 | 1,181,615 |
| 147 | LEADVILLE | 5 | 309,683 | 16 | 939,925 | 21 | 1,249,608 |
| 574 | LEFTHAND FPD | 0 | 0 | 3 | 215,000 | 3 | 215,000 |
| 149 | LITTLETON | 52 | 5,533,859 | 0 | 0 | 52 | 5,533,859 |
| 150 | LOCHBUIE | 9 | 727,058 | 0 | 0 | 9 | 727,058 |
| 214 | LOG LANE VILLAGE | 2 | 89,881 | 0 | 0 | 2 | 89,881 |

## Table 19 (continued) - Summary of Members and Adjusted Payroll by Employer

| City Code | City Name | Police No. | Police Earnings | Fire No. | Fire Earnings | Total No. | Total Earnings |
|---|---|---|---|---|---|---|---|
| 268 | LONE TREE | 52 | $ 4,849,697 | 0 | $ 0 | 52 | $ 4,849,697 |
| 151 | LONGMONT | 53 | 4,514,739 | 28 | 2,478,185 | 81 | 6,992,924 |
| 578 | LOS PINOS FPD | 0 | 0 | 26 | 1,654,287 | 26 | 1,654,287 |
| 7226 | LOWER VALLEY FPD | 0 | 0 | 21 | 1,303,989 | 21 | 1,303,989 |
| 7227 | LYONS FPD | 0 | 0 | 7 | 529,461 | 7 | 529,461 |
| 155 | MANASSA | 2 | 88,756 | 0 | 0 | 2 | 88,756 |
| 157 | MANITOU SPRINGS | 16 | 1,208,853 | 5 | 425,799 | 21 | 1,634,652 |
| 160 | MEAD | 12 | 1,079,402 | 0 | 0 | 12 | 1,079,402 |
| 163 | MILLIKEN | 9 | 736,670 | 0 | 0 | 9 | 736,670 |
| 167 | MONTROSE | 42 | 2,847,427 | 0 | 0 | 42 | 2,847,427 |
| 537 | MONTROSE FPD | 0 | 0 | 43 | 3,390,844 | 43 | 3,390,844 |
| 166 | MONTE VISTA | 10 | 552,954 | 0 | 0 | 10 | 552,954 |
| 168 | MONUMENT | 25 | 1,723,180 | 0 | 0 | 25 | 1,723,180 |
| 170 | MOUNTAIN VIEW | 9 | 618,710 | 0 | 0 | 9 | 618,710 |
| 516 | MOUNTAIN VIEW FPD | 0 | 0 | 148 | 16,212,319 | 148 | 16,212,319 |
| 266 | MOUNTAIN VILLAGE | 7 | 510,613 | 0 | 0 | 7 | 510,613 |
| 7246 | NEDERLAND FPD | 0 | 0 | 5 | 470,095 | 5 | 470,095 |
| 7251 | NORTH FORK FPD | 0 | 0 | 1 | 77,571 | 1 | 77,571 |
| 532 | NORTH METRO FIRE RESCUE | 0 | 0 | 158 | 16,109,795 | 158 | 16,109,795 |
| 7253 | NORTH ROUTT COUNTY | 0 | 0 | 4 | 228,840 | 4 | 228,840 |
| 7255 | NORTHEAST TELLER COUNTY FPD | 0 | 0 | 17 | 1,208,244 | 17 | 1,208,244 |
| 7259 | NORTH-WEST FPD | 0 | 0 | 19 | 1,101,371 | 19 | 1,101,371 |
| 178 | NUNN | 3 | 204,584 | 0 | 0 | 3 | 204,584 |
| 179 | OAK CREEK | 2 | 125,250 | 0 | 0 | 2 | 125,250 |
| 7263 | OAK CREEK FPD | 0 | 0 | 8 | 529,499 | 8 | 529,499 |
| 180 | OLATHE | 3 | 155,051 | 0 | 0 | 3 | 155,051 |
| 7264 | OLATHE FPD | 0 | 0 | 10 | 541,034 | 10 | 541,034 |
| 588 | PAGOSA FPD | 0 | 0 | 18 | 892,202 | 18 | 892,202 |
| 188 | PAGOSA SPRINGS | 7 | 490,973 | 0 | 0 | 7 | 490,973 |
| 189 | PALISADE | 10 | 642,317 | 7 | 423,024 | 17 | 1,065,342 |
| 190 | PALMER LAKE | 5 | 270,665 | 4 | 255,490 | 9 | 526,155 |
| 192 | PAONIA | 4 | 217,083 | 0 | 0 | 4 | 217,083 |

## Table 19 (continued) - Summary of Members and Adjusted Payroll by Employer

| City | | Police | | Fire | | Total | |
|---|---|---|---|---|---|---|---|
| Code | City Name | No. | Earnings | No. | Earnings | No. | Earnings |
| 106 | PARACHUTE | 5 | $ 321,320 | 0 | $ 0 | 5 | $ 321,320 |
| 191 | PARKER | 66 | 6,832,468 | 0 | 0 | 66 | 6,832,468 |
| 7281 | PEYTON FPD | 0 | 0 | 1 | 45,000 | 1 | 45,000 |
| 7481 | PLATEAU VALLEY FPD | 0 | 0 | 5 | 305,639 | 5 | 305,639 |
| 7285 | PLATTE CANYON FPD | 0 | 0 | 22 | 1,610,628 | 22 | 1,610,628 |
| 7287 | PLATTE VALLEY FPD | 0 | 0 | 23 | 1,872,888 | 23 | 1,872,888 |
| 196 | PLATTEVILLE | 9 | 591,556 | 0 | 0 | 9 | 591,556 |
| 513 | PLATTEVILLE/GILCREST FPD | 0 | 0 | 39 | 3,233,845 | 39 | 3,233,845 |
| 7289 | PLEASANT VIEW METRO FIRE DISTRICT | 0 | 0 | 10 | 745,043 | 10 | 745,043 |
| 518 | POUDRE FIRE AUTHORITY | 0 | 0 | 127 | 10,874,448 | 127 | 10,874,448 |
| 199 | PUEBLO | 194 | 14,655,163 | 132 | 10,422,426 | 326 | 25,077,589 |
| 519 | PUEBLO RURAL FPD | 0 | 0 | 28 | 1,705,774 | 28 | 1,705,774 |
| 7294 | PUEBLO W. METRO | 0 | 0 | 34 | 2,151,375 | 34 | 2,151,375 |
| 7298 | RATTLESNAKE FPD | 0 | 0 | 13 | 764,215 | 13 | 764,215 |
| 521 | RED WHITE & BLUE FPD | 0 | 0 | 57 | 5,459,559 | 57 | 5,459,559 |
| 551 | ROARING FORK FRA | 0 | 0 | 31 | 2,800,401 | 31 | 2,800,401 |
| 7314 | RYE FPD | 0 | 0 | 4 | 279,839 | 4 | 279,839 |
| 542 | SABLE-ALTURA FPD | 0 | 0 | 8 | 431,358 | 8 | 431,358 |
| 213 | SALIDA | 18 | 1,341,735 | 13 | 987,282 | 31 | 2,329,017 |
| 543 | SECURITY FPD | 0 | 0 | 47 | 3,072,928 | 47 | 3,072,928 |
| 219 | SEVERANCE | 7 | 551,710 | 0 | 0 | 7 | 551,710 |
| 220 | SHERIDAN | 27 | 2,399,913 | 0 | 0 | 27 | 2,399,913 |
| 222 | SILT | 6 | 381,425 | 0 | 0 | 6 | 381,425 |
| 525 | SOUTH ADAMS COUNTY FPD | 0 | 0 | 103 | 9,812,412 | 103 | 9,812,412 |
| 7339 | SOUTH FORK | 3 | 148,822 | 0 | 0 | 3 | 148,822 |
| 5339 | SOUTH FORK FPD | 0 | 0 | 8 | 362,228 | 8 | 362,228 |
| 540 | SOUTH METRO FIRE RESCUE FPD | 0 | 0 | 157 | 18,561,493 | 157 | 18,561,493 |
| 7340 | SOUTHEAST WELD FPD | 0 | 0 | 29 | 2,045,953 | 29 | 2,045,953 |
| 548 | SOUTHERN PARK COUNTY FPD | 0 | 0 | 2 | 107,000 | 2 | 107,000 |
| 552 | SOUTHWESTERN HIGHWAY 115 FPD | 0 | 0 | 1 | 85,000 | 1 | 85,000 |
| 229 | SPRINGFIELD | 2 | 131,757 | 0 | 0 | 2 | 131,757 |
| 231 | STEAMBOAT SPRINGS | 0 | 0 | 33 | 3,075,557 | 33 | 3,075,557 |

## Table 19 (continued) - Summary of Members and Adjusted Payroll by Employer

| City Code | City Name | Police No. | Police Earnings | Fire No. | Fire Earnings | Total No. | Total Earnings |
|---|---|---|---|---|---|---|---|
| 232 | STERLING | 18 | $ 1,178,277 | 22 | $ 1,327,678 | 40 | $ 2,505,955 |
| 7348 | STRASBURG FPD #8 | 0 | 0 | 7 | 370,885 | 7 | 370,885 |
| 7349 | STRATMOOR HILLS FPD | 0 | 0 | 7 | 437,669 | 7 | 437,669 |
| 545 | TELLURIDE FPD | 0 | 0 | 27 | 2,298,331 | 27 | 2,298,331 |
| 238 | THORNTON | 213 | 20,595,058 | 113 | 12,657,150 | 326 | 33,252,208 |
| 7354 | TIMBERLINE FPD | 0 | 0 | 10 | 625,414 | 10 | 625,414 |
| 2557 | TRI-LAKES MONUMENT FPD | 0 | 0 | 72 | 5,707,198 | 72 | 5,707,198 |
| 240 | TRINIDAD | 0 | 0 | 14 | 960,054 | 14 | 960,054 |
| 595 | UPPER PINE RIVER FPD | 0 | 0 | 38 | 2,276,904 | 38 | 2,276,904 |
| 7369 | WELLINGTON FPD | 0 | 0 | 19 | 1,226,933 | 19 | 1,226,933 |
| 7373 | WEST DOUGLAS COUNTY FPD | 0 | 0 | 1 | 64,000 | 1 | 64,000 |
| 534 | WEST METRO FPD | 0 | 0 | 349 | 34,825,993 | 349 | 34,825,993 |
| 7375 | WEST ROUTT FPD | 0 | 0 | 6 | 353,971 | 6 | 353,971 |
| 252 | WESTMINSTER | 169 | 16,873,722 | 128 | 12,775,949 | 297 | 29,649,671 |
| 2257 | WINDSOR | 49 | 3,974,999 | 0 | 0 | 49 | 3,974,999 |
| 7384 | WINDSOR SEVERANCE FPD | 0 | 0 | 55 | 5,041,499 | 55 | 5,041,499 |
| 254 | WIGGINS | 3 | 184,649 | 0 | 0 | 3 | 184,649 |
| 260 | WRAY | 6 | 346,056 | 0 | 0 | 6 | 346,056 |
| 262 | YUMA | 8 | 431,210 | 0 | 0 | 8 | 431,210 |
| | Totals | 3,982 | 364,661,879 | 6,004 | 546,489,456 | 9,986 | 911,151,335 |

# SECTION IV

## APPENDICES

# SUMMARY OF ACTUARIAL METHODS AND ASSUMPTIONS

I. Valuation Date

The valuation date is January 1st of each plan year. This is the date as of which the actuarial present value of future benefits and the actuarial value of assets are determined.

II. Actuarial Cost Method

The actuarial valuation uses the Entry Age Normal actuarial cost method. Under this method, the employer contribution rate is the sum of (i) the employer normal cost rate, and (ii) a rate that will amortize the unfunded actuarial liability.

1. The valuation is prepared on the projected benefit basis. The present value of each participant's expected benefit payable at retirement or termination is determined, based on age, service, sex, compensation, and the interest rate assumed to be earned in the future (7.00%). The calculations take into account the probability of a participant's death or termination of employment prior to becoming eligible for a benefit, as well as the possibility of their terminating with a service benefit. Future salary increases are also anticipated. The present value of the expected benefits payable on account of the active participants is added to the present value of the expected future payments to retired participants and beneficiaries to obtain the present value of all expected benefits payable from the Plan on account of the present group of participants and beneficiaries.

2. The employer contributions required to support the benefits of the Plan are determined following a level funding approach, and consist of a normal cost contribution and an accrued liability contribution.

3. The normal cost contribution is determined using the Entry Age Normal method. Under this method, a calculation is made to determine the average uniform and constant percentage rate of employer contribution which, if applied to the compensation of each participant during the entire period of his anticipated covered service (from hire), would be required in addition to the contributions of the participant to meet the cost of all benefits payable on their behalf.

4. The unfunded accrued liability contributions are determined by subtracting the actuarial value of assets from the actuarial accrued liability. In cases of surplus, this amount is amortized over 30 years. In cases of unfunded liability, this amount is amortized over a period such that the amortization provides for at least the interest accruing on the unfunded liability during the year. It is assumed that payments are made monthly throughout the year.

III. Actuarial Value of Assets

Effective January 1, 2013, the actuarial value of assets is equal to the market value of assets less a five-year phase in of the excess/(shortfall) between expected investment return and actual income. The actual calculation is based on the difference between actual earnings and expected earnings each year, and recognizes the cumulative excess return (or shortfall) over at a minimum rate of 20% per year. The speed of the recognition will increase if the Plan continues to be in the same net deferred position (net gain or net loss) from one year to the next. This is intended to ensure the smoothed value of assets will converge towards the market value in a reasonable amount of time. In addition, a gain or loss that is in the opposite direction of the current net position will be immediately recognized.

Expected earnings are determined using the assumed investment return rate and the beginning of year actuarial value of assets (adjusted for receipts and disbursements during the year). The returns are computed net of administrative and investment expenses. In future years, the returns will be net of investment expenses only.

IV. Actuarial Assumptions

The current assumptions were adopted by the Board in 2022 for first use in the actuarial valuation as of January 1, 2023, following a regularly scheduled experience study. The rationale for all of the current assumptions is included in that report, dated June 20, 2022.

A. Economic Assumptions

1. Investment return: 7.00% per annum, compounded annually, composed of an assumed 2.50% inflation rate and a 4.50% real rate of return. This rate represents the assumed return, net of all investment expenses.

2. Salary increase rate: Inflation rate of 2.50%, plus productivity component of 1.75%, plus step-rate/ promotional component as shown on the following page:

| Years of Service | Annual Step-rate/ Promotional Rate | Total Annual Rate of Increase Including 2.50% Inflation Component and 1.75% Productivity Component |
|---|---|---|
| (1) | (2) | (4) |
| 1 | 7.50% | 11.75% |
| 2 | 7.50% | 11.75% |
| 3 | 7.00% | 11.25% |
| 4 | 6.50% | 10.75% |
| 5 | 3.75% | 8.00% |
| 6 | 1.75% | 6.00% |
| 7 | 1.75% | 6.00% |
| 8 | 1.25% | 5.50% |
| 9 | 1.25% | 5.50% |
| 10 | 1.00% | 5.25% |
| 11 | 1.00% | 5.25% |
| 12 | 0.75% | 5.00% |
| 13 | 0.75% | 5.00% |
| 14 | 0.50% | 4.75% |
| 15 | 0.00% | 4.25% |

Salary increases are assumed to occur once a year, on January 1. Therefore the pay used for the period between the valuation date and the first anniversary of the valuation date is equal to the reported pay for the prior year, annualized if necessary, and then increased by the salary increase assumption.

3. Payroll growth rate: In the amortization of surplus assets and funding projections, payroll is assumed to increase 3.00% per year. This increase rate is primarily due to the effect of inflation on salaries, with no allowance for future membership growth.

B. Demographic Assumptions

1. Healthy retirees and beneficiaries: Healthy retirees and beneficiaries: Pub-2010 Safety Healthy Annuitant Mortality Tables for males and females, amount-weighted, projected with the ultimate values of the MP-2020 projection scale.

| | Annual Rate per 1,000 Members | | | | |
|---|---|---|---|---|---|
| Attained Age in 2023 | Males | Females | Attained Age in 2023 (cont.) | Males | Females |
| (1) | (2) | (3) | (4) | (5) | (6) |
| 50 | 1.61 | 1.25 | 70 | 13.33 | 11.30 |
| 55 | 2.56 | 2.16 | 75 | 24.25 | 19.69 |
| 60 | 4.26 | 3.74 | 80 | 44.20 | 34.31 |
| 65 | 7.42 | 6.49 | 85 | 81.54 | 61.07 |

The following table provides the life expectancy in years for an individual age 55 at retirement in a given year based on the assumption with full generational projection:

| | Year of Retirement | | | |
|---|---|---|---|---|
| Gender | 2023 | 2028 | 2033 | 2038 |
| Male | 31.2 | 31.6 | 32.0 | 32.4 |
| Female | 33.1 | 33.5 | 33.9 | 34.3 |

2. Mortality rates (active members) – Pub-2010 Safety Healthy Employee Mortality Tables for males and females, amount-weighted, projected with the MP-2020 Ultimate projection scale, 60% multiplier for off-duty mortality. Increased by 0.00015 for on-duty related Fire and Police experience. Sample rates are shown below:

| | Annual Rate per 1,000 Members | | | | |
|---|---|---|---|---|---|
| Attained Age in 2023 | Males | Females | Attained Age in 2023 (cont.) | Males | Females |
| (1) | (2) | (3) | (4) | (5) | (6) |
| 20 | 0.36 | 0.23 | 40 | 0.45 | 0.40 |
| 25 | 0.34 | 0.25 | 45 | 0.56 | 0.49 |
| 30 | 0.36 | 0.29 | 50 | 0.75 | 0.61 |
| 35 | 0.39 | 0.33 | 55 | 1.03 | 0.77 |

3. Disability rates: Sample rates are shown below by age and disability type.

| | Annual Rate per 1,000 Members | |
|---|---|---|
| Age | Occupational Disability Rates | Total Disability Rates |
| (1) | (2) | (3) |
| 25 | 0.48 | 0.02 |
| 30 | 2.26 | 0.17 |
| 35 | 3.05 | 0.34 |
| 40 | 4.48 | 0.52 |
| 45 | 5.53 | 0.72 |
| 50 | 8.22 | 0.94 |
| 55 | 11.56 | 1.17 |

*Disability rates are set to zero at eligibility for normal retirement.*

4. Termination rates (for causes other than death, disability or retirement): Termination rates are based on service. Termination rates are not applied after a member becomes eligible for a retirement benefit. Rates at selected ages are shown:

| | Annual Rate per 1,000 Members | | | | |
|---|---|---|---|---|---|
| Service | Rates | Service (cont.) | Rates | Service (cont.) | Rates |
| 0 | 91.9 | 9 | 25.8 | 18 | 12.3 |
| 1 | 70.4 | 10 | 22.9 | 19 | 11.7 |
| 2 | 62.2 | 11 | 20.6 | 20 | 11.2 |
| 3 | 54.9 | 12 | 18.6 | 21 | 10.6 |
| 4 | 48.3 | 13 | 17.0 | 22 | 9.8 |
| 5 | 42.5 | 14 | 15.6 | 23 | 9.0 |
| 6 | 37.4 | 15 | 14.5 | 24 | 7.9 |
| 7 | 33.0 | 16 | 13.7 | 25 | 6.6 |
| 8 | 29.1 | 17 | 12.9 | 26 | 5.1 |

For police members, these rates are multiplied by 1.25. For fire members, these rates are multiplied by 0.83.

5. Retirement rates:

Age-Based Retirement rates, for members with more than 25 years of service

| Age | Annual Rate per 100 Members |
|---|---|
| 55 | 60 |
| 56-61 | 45 |
| 62 | 100 |

The rates above apply to members first meeting normal retirement eligibility at age 55 or later. For those that meet the Rule of 80 prior to age 55, rates from eligibility age to age 55 were as follows:

- First eligibility: (Age-50) x 10% + 10%
- After first eligibility but before age 55: 45% - 5% x (55-Age)
- Age 55: 45%

Service-Based Retirement rates*

| Service | Annual Rate per 100 Members |
|---|---|
| 5-14 | 8 |
| 15 | 9 |
| 16 | 9 |
| 17 | 10 |
| 18 | 11 |
| 19 | 12 |
| 20 | 13 |
| 21 | 15 |
| 22 | 20 |
| 23-24 | 25 |

*Rates first applied at age 55; 100 percent retirement assumed at age 70.

C. <u>Other Assumptions</u>

1. Administrative expenses: An explicit administrative expense equal to the prior year actual expenses.

2. Covered payroll projected for the calendar year following the valuation date (used in determining the contribution rate necessary to amortize the unfunded liability) is equal to actual pay that was paid during the calendar year preceeding the valuation date for members active at any time during that period increased by the payroll growth rate assumption.

3. Percent married: 100% of employees are assumed to be married or in a civil union.

4. Age difference: Male members are assumed to be two years older than their spouses, and female members are assumed to be two years younger than their spouses.

5. Post-retirement benefit adjustments: 0%.

6. Percent electing annuity on death (when eligible): All of the spouses of vested, married participants are assumed to elect an annuity.

7. 10% of members who become occupationally disabled after the age of 50 will transfer back to the Statewide Retirement Plan at age 55. No other assumption is made for recoveries once disabled.

8. Percent electing deferred termination benefit: Vested terminating members are assumed to elect a refund or a deferred benefit, whichever is more valuable at the time of termination.

9. No surviving spouse will remarry and there will be no children's benefit.

10. Assumed age for commencement of deferred benefits: Members electing to receive a deferred benefit are assumed to commence receipt at the first age at which unreduced benefits are available.

11. Pay increase timing: Beginning of (fiscal) year. This is equivalent to assuming that reported pays represent amounts paid to members during the year ended on the valuation date.

12. Decrement timing: Decrements of all types are assumed to occur mid-year.

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

14. Decrement relativity: Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.

15. Incidence of Contributions: Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.

16. Benefit Service: All members are assumed to accrue 1 year of service each year. Exact fractional service is used to determine the amount of benefit payable.

17. Inactive Population: All members included in the inactive non-vested population with at least 10 years of service are valued using two times member contributions.

D. Participant Data

Participant data was supplied on electronic files in the form of spreadsheets. There were separate tabs for (i) active and non-vested inactive members, and (ii) members and beneficiaries receiving benefits or vested inactives.

The data for active members included birthdate, sex, service, salary and employee contribution account balance. For retired members and beneficiaries, the data included date of birth, sex, spouse's date of birth (where applicable), amount of monthly benefit, date of retirement, and a form of payment code.

Salary supplied for the current year was based on the earnings for the year preceding the valuation date adjusted for service accrued during the year. In cases where the earnings for the year two years prior to the valuation date was higher, this higher amount was used. This salary was adjusted by the salary increase rate for one year.

Assumptions were made to correct for missing, bad, or inconsistent data. These had no material impact on the results presented.

E. <u>Changes to the assumptions:</u>

The following changes to assumptions have been made since the prior valuation based on the recommendations in the 2022 Experience Study.

- Mortality rates and mortality improvement were updated to reflect recently published tables.
- The step-rate increase portion of the salary scale was increased by 0.50% per year for the first 4 years of a member's career and 0.25% for years 5 through 14 in accordance with the observed experience.
- The payroll growth rate assumption was reduced from 3.50% to 3.00%.
- Minor adjustments were made to termination and retirement rates to reflect observed experience.

# SUMMARY OF BENEFIT PROVISIONS

**Plan Description**

The Fire & Police Pension Association Defined Benefit System – Statewide Retirement Plan ("Plan") is a cost-sharing multiple-employer defined benefit pension plan. The Plan covers substantially all full-time employees of participating fire or police departments in Colorado hired on or after April 8, 1978, provided that they are not already covered by a statutorily exempt plan. The Statewide Defined Benefit Plan was established in 1980 pursuant to Colorado Revised Statutes. The Statewide Hybrid Plan was established January 1, 2004 pursuant to Colorado Revised Statutes. HB 22-1034 combined the assets and liabilities of the former Statewide Defined Benefit Plan and the Statewide Hybrid Plan to form the Statewide Retirement Plan. The combined membership now participates under one of four benefit "components":

- Defined Benefit Component
- Hybrid Defined Benefit Component
- Money Purchase Component
- Social Security Component

Members in the Money Purchase Component may convert their money purchase balance to an annuity at retirement but are not otherwise a part of the defined benefit program. Members covered under the defined benefit components may also participate in the Money Purchase Component. For the Money Purchase Component, Members have the option of choosing among various investment options offered by an outside investment manager. The Plan assets for the defined benefit components are included in the Fire & Police Members' Benefit Investment Fund Long-Term Pool and Plan assets associated with the Money Purchase Component and the Deferred Retirement Option Plan "DROP" are included in the Fire & Police Members' Self-Directed Investment Fund.

Employers once had the option to elect to withdraw from the Plan, but a change in state statutes permitted no further withdrawals after January 1, 1988, unless the Employer elects into and is determined to be eligible to participate in the Statewide Money Purchase Plan. In 2003, legislation was enacted to allow departments who cover their firefighters and police officers in money purchase plans to elect coverage under the FPPA Defined Benefit System.

As of August 5, 2003, the Plan may include clerical and other personnel from fire districts whose services are auxiliary to fire protection. As of January 1, 2020, Colorado police and sheriff departments who participate in Social Security have the option of affiliating for coverage under the Defined Benefit System and the Statewide Death and Disability Plan.

**Plan Year**

A twelve-month period ending December 31.

**Members Included**

Members included are active, full-time salaried employees of a participating municipality, fire protection district, fire authority, or county improvement district normally serving at least 1,600 hours in a calendar year and whose duties are directly involved with the provision of police or fire protection. As of August 5, 2003, the Plan may also include clerical and other personnel employed by a fire protection district, fire authority, or a county improvement district.

Also included are employees of any Employer that covers Members under the federal Social Security Act or any county that chooses to affiliate with the Fire & Police Pension Association and includes all personnel employed by a sheriff expected to work 1,600 hours or more in a calendar year who are directly involved with the provision of law enforcement or fire protection as certified by the county.

**Compensation Considered (Base Salary)**

Base Salary, also known as Pensionable Earnings, means the total base rate of pay including Member Contributions to the Statewide Retirement Plan or Statewide Money Purchase Plan which are “picked up” by the Employer:

1) And shall also include longevity pay, sick leave pay taken in the normal course of employment, vacation leave pay taken in the normal course of employment, shift differential, and mandatory overtime that is part of the Member’s fixed, periodic compensation.

2) Accumulated vacation leave pay will also be included if a Member completes his/her service requirement for purposes of Normal retirement while exhausting accumulated vacation leave.

3) In the event an Employer has established or does establish a Deferred Compensation Plan, the amount of the Member's salary that is deferred shall be included in the Member's Base Salary.

4) Any amounts voluntarily contributed to an Internal Revenue Code Section 125 “Cafeteria Plan” shall be included in the Member's Base Salary.

5) Base Salary shall not include overtime pay (except as noted in the preceding sentence), step-up pay or other pay for temporarily acting in a higher rank, uniform allowances, accumulated sick leave pay, accumulated vacation leave pay (except as noted in Section 2) above), and other forms of extra pay (including Member Contributions which are paid by the Employer and not deducted from the Member's salary).

**Contribution Rates**

Contribution rates for this Plan are set by state statute and can also be amended by the Board after election of Members and Employers.

Members of the Defined Benefit Component contribute at the rate of 12 percent of Base Salary. Legislation passed in 2020 to increase historical employer rates of 8 percent. This legislation schedule increases of 0.5 percent per year over 10 years from 2021 to 2030 to a total of 13 percent of Base Salary. The total combined contribution rate will be 25% of Base Salary in 2030.

Members of the Social Security Component contribute at the rate of 6 percent of Base Salary. Legislation passed in 2020 to increase historical employer rates of 4 percent. This legislation schedule increases of 0.25 percent per year over 10 years from 2021 to 2030 to a total of 6.5 percent of Base Salary. The total combined contribution rate will be 12.5% of Base Salary in 2030.

Members of the Hybrid Defined Benefit Component and their employers have historically contributed at a minimum rate of 8 percent of Base Salary. Legislation passed in 2022 which increases both member and employer rates 0.125 percent per year over eight years from 2023 to 2030 to a total of 9.0 percent of Base Salary. The total combined minimum contribution rate will be 18.0% of Base Salary in 2030.

The amount of the Hybrid Defined Benefit Component allocated to the Defined Benefit assets is set annually by the Board of Directors. Excess contributions fund the Money Purchase Component of the Plan. Current policy is to proportionally allocate contributions to the Defined Benefit assets based on the current Defined Benefit Component contributions, reflecting the relative benefit levels of the two components. Details regarding this approach are included in Table 4.

Members and their employers may contribute above the statutory minimums. Any excess contributions are allocated to the Money Purchase Component.

Contributions from Members and Employers of plans reentering the system are established by resolution and approved by the Board of Directors. The Board has determined that the continuing rate of contribution for departments that completed the reentry process prior to 2021 will be 0.2 percent of Base Salary. For departments that complete the reentry process on or after January 1, 2021, the continuing rate of contribution will be set at 1.9 percent of Base Salary and will be reevaluated after two years of employer specific experience, at which point, the rate may stay the same or may be decreased.

**Defined Benefit Component – Minimum Contribution Rate Implementation Schedule**

| Effective Date | Member Contribution Rate | Employer Contribution Rate | Total Combined Contribution Rate |
|---|---|---|---|
| 1/1/2023 | 12.0% | 9.50% | 21.5% |
| 1/1/2024 | 12.0% | 10.0% | 22.0% |
| 1/1/2025 | 12.0% | 10.5% | 22.5% |
| 1/1/2026 | 12.0% | 11.0% | 23.0% |
| 1/1/2027 | 12.0% | 11.5% | 23.5% |
| 1/1/2028 | 12.0% | 12.0% | 24.0% |
| 1/1/2029 | 12.0% | 12.5% | 24.5% |
| 1/1/2030 | 12.0% | 13.0% | 25.0% |
| Beyond | 12.0% | 13.0% | 25.0% |

**Social Security Component – Minimum Contribution Rate Implementation Schedule**

| Effective Date | Member Contribution Rate | Employer Contribution Rate | Total Combined Contribution Rate |
|---|---|---|---|
| 1/1/2023 | 6.00% | 4.75% | 10.75% |
| 1/1/2024 | 6.00% | 5.00% | 11.00% |
| 1/1/2025 | 6.00% | 5.25% | 11.25% |
| 1/1/2026 | 6.00% | 5.50% | 11.50% |
| 1/1/2027 | 6.00% | 5.75% | 11.75% |
| 1/1/2028 | 6.00% | 6.00% | 12.00% |
| 1/1/2029 | 6.00% | 6.25% | 12.25% |
| 1/1/2030 | 6.00% | 6.50% | 12.50% |
| Beyond | 6.00% | 6.50% | 12.50% |

**Hybrid Defined Benefit Component – Minimum Contribution Rate Implementation Schedule (prior to money purchase allocation)**

| Effective Date | Member Contribution Rate | Employer Contribution Rate | Total Combined Contribution Rate |
|---|---|---|---|
| 1/1/2023 | 8.125% | 8.125% | 16.25% |
| 1/1/2024 | 8.250% | 8.250% | 16.50% |
| 1/1/2025 | 8.375% | 8.375% | 16.75% |
| 1/1/2026 | 8.500% | 8.500% | 17.00% |
| 1/1/2027 | 8.625% | 8.625% | 17.25% |
| 1/1/2028 | 8.750% | 8.750% | 17.50% |
| 1/1/2029 | 8.875% | 8.875% | 17.75% |
| 1/1/2030 | 9.000% | 9.000% | 18.00% |
| Beyond | 9.000% | 9.000% | 18.00% |

**Highest Average Salaries (HAS)**
HAS is the average of the Member's highest three annual Base Salaries.

**Normal Retirement Date**
A Member's Normal Retirement shall be the date on which the Member has completed at least 25 years of credited service and has attained the age of 55. Normal Retirement also includes the Rule of 80 (age plus service must total at least 80, with a minimum age of 50).

**Normal Retirement Benefit**
*Defined Benefit Component:*
The annual Normal Retirement Benefit shall be 2 percent of the average of the Member's highest three years Base Salary for each year of credited service up to ten years plus 2.5 percent for each year thereafter.

*Hybrid Benefit Component:*
The annual Normal Retirement Benefit shall be 1.5 percent of the average of the Member's highest three years Base Salary for each year of credited service. Benefits associated with service earned prior to January 1, 2023 shall be based on 1.9 percent of the average of the Member's highest three years Base Salary for each year of credited service.

*Social Security Component:*
The benefit for Members of affiliated social security employers will be reduced by the amount of social security income the Member receives annually, calculated as if the social security benefit started as of age 62 for benefits prior to 2007. Beginning January 1, 2007, Members of affiliated social security employers who participate in the Social Security Component shall be 1 percent of the average of the Member's highest three years Base Salary for each year of credited service up to ten years plus 1.25 percent for each year thereafter.

Benefits are paid as a monthly life annuity. Other forms of payment are available.

**Early Retirement Benefit**
A Member shall be eligible for an Early Retirement Benefit after completion of 30 years of service or attainment of age 50 with at least five years of credited service. The Early Retirement Benefit shall be the Normal Retirement Benefit reduced on an actuarially equivalent basis.

Benefits are paid as a monthly life annuity. Other forms of payment are available.

**Terminated Vested Benefit**
A Member who terminates with at least five years of service is vested. A vested Member who does not withdraw their contributions from the Plan is eligible for a vested benefit, payable at age 55, equivalent to the Normal Retirement Benefit.

**Deferred Retirement Benefit**
Members who qualify for a Normal or Vested Retirement may defer the receipt of their defined benefit pension to as late as age 65 and receive the actuarial equivalent of the benefit.

**Severance Benefit**
All Members leaving covered employment with less than five years of service credit are eligible. Optionally, vested Members (those with five or more years of service credit) may withdraw their accumulated contributions in lieu of the future vested benefits otherwise due.

The Member receives a lump-sum payment equal to the sum of their Member contributions, plus 5 percent, credited as interest.

**Death Benefit of Active Members**
Death must have occurred while an active or an inactive, non-retired Member.

Upon the death of a non-vested active, unmarried Member with no spouse, no dependent children, and no beneficiary, a refund of the Member's contributions is paid to the Member's estate. If the Member was vested, single and had no dependent children and was not eligible for a Normal or Early retirement, a joint and survivor annuity may be paid to the beneficiary if greater than the refund. The benefit for Members of affiliated social security employers earned prior to January 1, 2007 will be reduced by the amount of social security income the Member receives annually.

Survivors (spouse or dependent children) of active Members who die prior to retirement eligibility may be covered by the benefits provided by the Statewide Death & Disability Plan. For purposes of the Statewide Death & Disability Plan benefits, a spouse includes a partner in a civil union.

Survivors of an active or inactive Member who is eligible for a Normal or Early retirement and who dies after leaving active service but before electing a payment option or receiving the first pension payment is eligible to receive a benefit according to payment Option 1 (Joint and 100% Survivor benefits).

**Forms of Payment**
The Plan provides six choices for receipt of the retirement benefit.

Normal Option – The retiree receives a monthly pension benefit for their life. No monthly benefits are paid to a beneficiary following the retiree's death. However, if at the time of the Member's death, they have not recouped in pension payments the amount of the Member contributions (including all funds paid in to purchase service credit), the remaining funds plus 5% as interest would be paid to the Member's beneficiary or estate as a lump sum.

Option 1 (Joint and 100% Survivor) - Under Option 1, an actuarially equivalent Normal, Deferred, Early or Vested Retirement pension will be paid from the effective date of the retiree's retirement or later in the case of a deferred retirement. The actuarially equivalent monthly pension will continue for the life of the retiree. Upon the death of the retiree, the same monthly pension will be paid to the retiree's designated beneficiary for life.

Option 2 (Joint and 50% Survivor) - Under Option 2, an actuarially equivalent Normal, Deferred, Early or Vested Retirement pension will be paid from the effective date of the retiree's retirement or later in the case of a deferred retirement. The actuarially equivalent monthly pension will continue for the life of the retiree. Upon the death of the retiree, 50% of the same monthly pension will be paid to the retiree's designated beneficiary for life.

Option 3 (Joint and 50% Last Survivor) - Under Option 3, an actuarially equivalent Normal, Deferred, Early or Vested Retirement monthly pension will be shared by the retiree and their named beneficiary. Upon the death of either the retiree or the designated beneficiary, 50% of the same monthly pension will be paid to the survivor for life.

Option 4 (Joint and 100% Survivor with "Pop Up") – Under Option 4, an actuarially equivalent Normal, Deferred, Early or Vested Retirement pension will be paid from the effective date of the retiree's retirement or later in the case of a deferred retirement. The actuarially equivalent monthly pension will continue for the life of the retiree. Upon the death of the retiree, the same monthly pension will be paid to the retiree's designated beneficiary for life. However, if the designated beneficiary dies before the retiree, the monthly pension benefit "pops-up" or reverts to the Normal Option effective with the first day of the month following the date of the death of the beneficiary.

Option 5 (Joint and 50% Survivor with "Pop Up") – Under Option 5, an actuarially equivalent Normal, Deferred, Early or Vested Retirement pension will be paid from the effective date of the retiree's retirement or later in the case of a deferred retirement. The actuarially equivalent monthly pension will continue for the life of the retiree. Upon the death of the retiree, 50 percent of the same monthly pension benefit will be paid to the retiree's beneficiary for life. However, if the beneficiary dies before the retiree, the monthly pension benefit "pops-up" or reverts to the Normal Option effective with the first day of the month following the date of the death of the beneficiary.

Survivor benefits are paid according to the payment option elected by the Member at the time of retirement or entry into DROP.

Actuarial equivalence is based on tables adopted by the Board of Directors.

**Cost-of-Living Adjustments (COLAs) for Benefits in Pay Status**
Benefits to Members and beneficiaries may be increased annually on October 1. The amount is based on the Fire & Police Pension Association Board of Directors discretion and can range from 0 percent to the greater of 3 percent or the Consumer Price Index for Urban Wage Earners and Clerical Workers (CPI-W). COLAs may begin once the retired Member has been receiving retirement benefits for at least 12 calendar months prior to October 1.

**Deferred Retirement Option Plan (DROP)**
A Member may elect to participate in the DROP after reaching eligibility for Normal Retirement, Early Retirement, or Vested Retirement and age 50. A Member can continue to work while participating in the DROP, but must terminate employment within five years of entry into the DROP. The Member's retirement benefit is determined at the time of entry into the DROP. The monthly payments that begin at entry into the DROP are accumulated in a DROP account until the Member terminates service, at which time the DROP

accumulated benefits can be paid as periodic installments, a lump sum, or if desired a Member may elect to convert all, or a portion, of the DROP to a lifetime monthly benefit with survivor benefits. While participating in DROP, the Member continues to make pension contributions, which are credited to the DROP.

**Investment Pool**

The Statewide Retirement Plan is invested in the Long-Term Pool is designed primarily for open plans with a longer time horizon, higher risk tolerance, and lower liquidity needs. The investment return assumption is 7.00%.

# RISKS ASSOCIATED WITH MEASURING THE ACCRUED LIABILITY AND ACTUARIALLY DETERMINED CONTRIBUTION

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

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

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

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

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

The computed contribution rates shown in this report may be considered as a minimum contribution rate that complies with the Board's funding policy and state statute. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

With each valuation there is a presentation of the summary of findings to the Board. Included are various discussions and scenarios of potential risks.

***Plan Maturity Measures***

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

| | 2023 | 2022 | 2021 |
|---|---|---|---|
| Ratio of the market value of assets to total payroll | 4.1 | 4.9 | 4.5 |
| Ratio of actuarial accrued liability to payroll | 4.1 | 4.0 | 4.0 |
| Ratio of actives to retirees and beneficiaries | 4.0 | 4.2 | 4.8 |
| Net cash flow as a percentage of market value of assets[1] | 2.3% | -1.3% | 1.9% |
| Duration of the actuarial accrued liability | 13.9 | 13.9 | 13.5 |

[1]*Negative net cash flows during 2021 are reflective of the transfer of assets to the Members' Self-Directed Investment Fund. Absent this transfer, net cash flow as a percentage of market value of assets would have been 1.8%.*

*Amounts for 2022 and 2021 reflect the results of the former Statewide Defined Benefit Plan.

**RATIO OF MARKET VALUE OF ASSETS TO PAYROLL:**

The relationship between assets and payroll is a useful indicator of the potential volatility of contributions. For example, if the market value of assets is 4.0 times the payroll, a return on assets 5% different than assumed would equal 20% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in plan sponsor contributions as a percentage of payroll.

**RATIO OF ACTUARIAL ACCRUED LIABILITY TO PAYROLL:**

The ratio of liability to payroll may also be used as a measure of sensitivity of the liability itself. For example, if the actuarial accrued liability is 5.0 times the payroll, a change in liability 2% other than assumed would equal 10% of payroll. A higher (lower) or increasing (decreasing) level of this maturity measure generally indicates a higher (lower) or increasing (decreasing) volatility in liability (and also plan sponsor contributions) as a percentage of payroll.

The relationship between the actuarial accrued liability and payroll is a useful indicator of the potential longer term asset-related volatility once the current UAAL is fully amortized. A funding policy that targets a funded ratio of 100% is expected to result in the ratio of assets to payroll and the ratio of liability to payroll converging over time.

**RATIO OF ACTIVES TO RETIREES AND BENEFICIARIES:**

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

**NET CASH FLOW AS A PERCENTAGE OF MARKET VALUE OF ASSETS:**

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

**DURATION OF LIABILITIES:**

The duration of the present value of future benefits may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the present value of future benefits would increase approximately 10% if the assumed rate of return were lowered 1%. This is also an approximation of the discount-weighted average time horizon of the liability.