

Fire and Police Pension Association Statewide Death & Disability Plan

Actuarial Valuation Report
for the Year Beginning January 1, 2018



June 30, 2018

Board of Directors
Fire and Police Pension Association
5290 DTC Parkway, Suite 100
Greenwood Village, Colorado 80111

Re: Actuarial Valuation of the FPPA Statewide Death & Disability Plan (the Plan) as of January 1, 2018

Dear Members of the Board:

We are pleased to present our Report on the actuarial valuation of the Statewide Death & Disability Plan for the Fire and Police Pension Association (FPPA) as of January 1, 2018.

We certify that the information included herein and contained in our 2018 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the FPPA Statewide Death & Disability Plan as of January 1, 2018.

Our Report presents the results of the January 1, 2018 actuarial valuation of the FPPA Statewide Death & Disability Plan (D&D). The report describes the current actuarial condition of the D&D, determines the appropriateness of the contribution rate for certain members, and analyzes changes since the last valuation. The results presented herein may not be applicable for other purposes.

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

Financing Objectives

Contribution rates are established by law as a percentage of payroll. The contributions are intended to finance the future benefits payable from the Plan using a modified version of the aggregate actuarial cost method.

Progress toward Realization of Financing Objectives

The unfunded actuarial accrued liability and the funded ratio (ratio of the actuarial value of assets to the net present value of benefits) illustrate the progress toward the realization of certain financing objectives. Based on our actuarial valuation as of January 1, 2018, the Plan has current assets greater than current liabilities by \$0.5 million assuming no allowance for future discretionary benefit adjustments for non-totally disabled benefit recipients.

The Board increased the annual contribution rate for members hired on or after January 1, 1997 to 2.70% effective January 1, 2017. The contribution rate for these members can only be adjusted every two (2) years. Based on smoothed assets, the cost of providing benefits is 2.69%, therefore, the current 2.70% contribution rate is adequate to provide a material level of future discretionary benefit adjustments.

Benefit provisions

All of the benefit provisions reflected in this valuation are those which were in effect on January 1, 2018. There were no changes in provisions since the prior valuation. The benefit provisions are summarized in Appendix B of our Report.

Assumptions and methods

The current actuarial methods and assumptions were adopted by the Board of Directors of FPPA for first use in the actuarial valuation as of January 1, 2016, based upon the actuary's analysis and recommendations from the 2015 Experience Study. For information regarding the rationale for the assumptions chosen, please see the experience study report dated June 1, 2015. There have been no changes in assumptions or methods since the prior valuation. 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 reasonably 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.

Data

FPPA supplied data for active and disabled members as of January 1, 2018. 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, 2018.



GASB Accounting

The Governmental Accounting Standards Board (GASB) Statement No. 74, Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans (Issued 6/2015), has replaced the requirements under GASB Statement No. 43, effective for financial statements for fiscal years beginning after June 15, 2016. GASB Statement No. 75, Accounting and Financial Reporting for Postemployment Benefits Other Than Pensions (Issued 6/2015), has replaced GASB Statement No. 45, effective for fiscal years beginning after June 15, 2017. Plan reporting information for GASB Statement No. 74 can be found in the FPPA Comprehensive Annual Financial Report at FPPA's website - FPPAco.org. There will be no employer reporting for GASB Statement No. 75 as all contributions to the FPPA Statewide Death & Disability Plan are made by members or on behalf of members.

Projected Actuarial Results

The following table shows the Funded Ratio (FR) and Annual Required Contribution (ARC) 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 beyond 2018 are based on the same assumptions, methods and provisions used for the January 1, 2018 valuation.

5-Year Deterministic Projection						
January 1,	Market Value Investment Return					
	3.50%		7.50%		11.50%	
	FR	ARC	FR	ARC	FR	ARC
2018	100.1%	2.69%	100.1%	2.69%	100.1%	2.69%
2019	99.9%	2.71%	100.7%	2.67%	101.5%	2.63%
2020	98.8%	2.75%	101.3%	2.64%	103.6%	2.53%
2021	97.0%	2.84%	101.8%	2.62%	106.5%	2.40%
2022	94.5%	2.96%	102.3%	2.59%	110.1%	2.23%
2023	91.2%	3.11%	102.3%	2.59%	113.9%	2.04%

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.



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, ERISA, and the Statements of the Governmental Accounting Standards Board.

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

Respectfully submitted,
Gabriel, Roeder, Smith & Company



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SECTION I

EXECUTIVE SUMMARY

Executive Summary

Item	January 1, 2018	January 1, 2017
Membership <ul style="list-style-type: none"> • Number of: <ul style="list-style-type: none"> - Active members - Total disabled members & beneficiaries - Occupational disabled members & beneficiaries - Survivors of deceased active members - Total • Annualized payroll supplied by FPPA 	 12,214 145 913 <u>127</u> 13,399 \$ 947,520	 11,975 139 852 <u>120</u> 13,086 \$ 917,100
Recommended contribution rates for members hired on or after January 1, 1997 and members covered by Social Security	2.70%	2.70%
Assets <ul style="list-style-type: none"> • Market value • Actuarial value • Rate of return on market value • Rate of return on actuarial value • Contribution for prior year • Ratio of actuarial value to market value 	\$ 403,693 \$ 395,302 14.7% 8.1% \$ 20,535 97.9%	\$ 360,747 \$ 374,944 5.2% 6.3% \$ 18,216 103.9%
Actuarial Information <ul style="list-style-type: none"> • Unfunded actuarial accrued liability/(surplus) • GASB funded ratio 	\$ (528) 100.1%	\$ (17,028) 104.8%

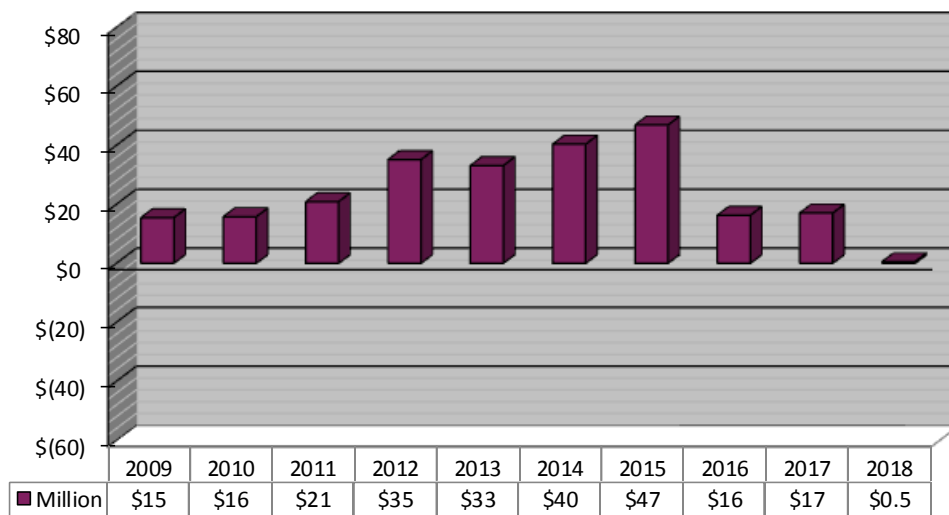
Note: Dollar amounts in \$000

Executive Summary

1. The annual contribution rate for members hired on or after January 1, 1997 and for members covered by Social Security is 2.7% as of January 1, 2018.
2. This rate was last increased from 2.6% to 2.7% as of January 1, 2017. Based on the January 1, 2016 valuation, the Board elected to increase contribution rate from 2.6% to 2.7% beginning January 1, 2017.
3. The number of total members increased from 13,086 in 2017 to 13,399 in 2018, an increase of 2.4%.
4. Current plan benefits provide an automatic annual 3.0% benefit adjustment to totally disabled members and their beneficiaries but assume no future benefit adjustments for other members. Based on actuarial estimations, the current 2.7% contribution rate could sustain a 0.01% permanent annual benefit adjustment.
5. The plan assets at the valuation date are in excess of the net present value of benefits by \$0.5 million. This surplus position compares to the \$17 million surplus position last year. The Plan is “fully funded” assuming no future discretionary benefit adjustments for non-totally disabled benefit recipients.
6. Assets earned 14.7% on a market basis and 8.1% on an actuarial basis in 2017, producing an actuarial gain of \$2.1 million.
7. The funded ratio decreased from 104.8% to 100.1% as of January 1, 2018.

The following chart shows the history of the (Unfunded Actuarial Accrued Liability)/Surplus as of past historical valuation dates. The dollar values are in millions.

Historical (UAAL)/Surplus



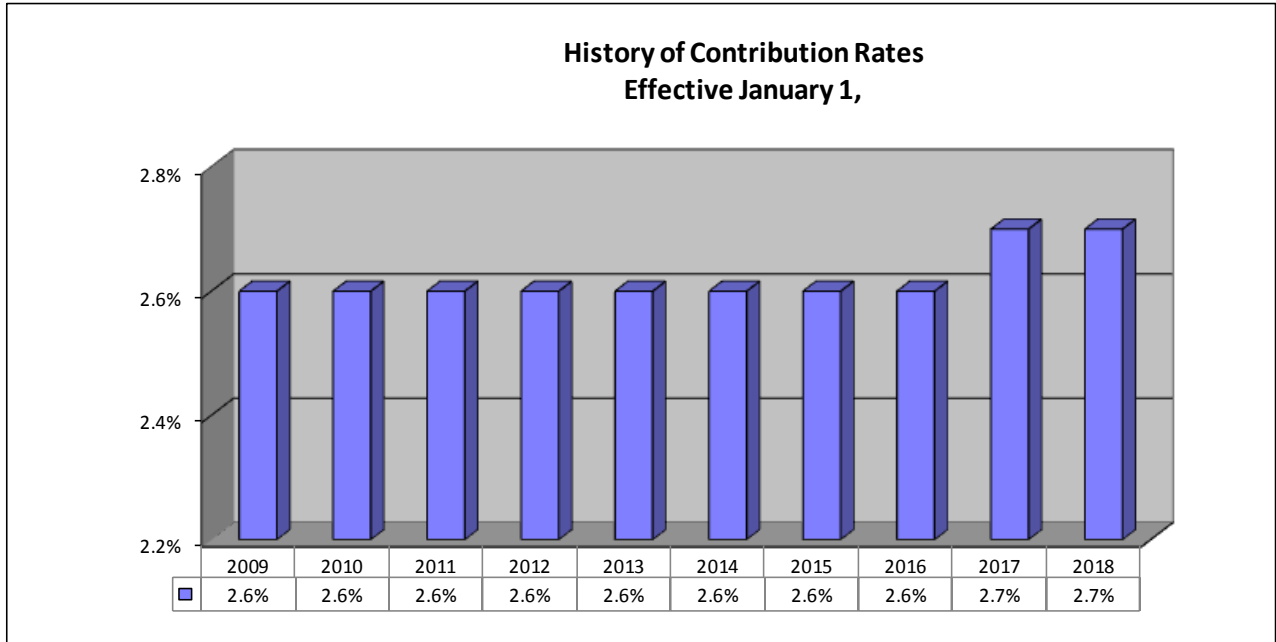
SECTION II

DISCUSSION

Contribution Requirements

The valuation of the Fire and Police Pension Association Statewide Death & Disability Plan (D&D) as of January 1, 2018, reflects a current employee contribution rate of 2.7% for members hired on or after January 1, 1997. By statute, this rate can change only every two years.

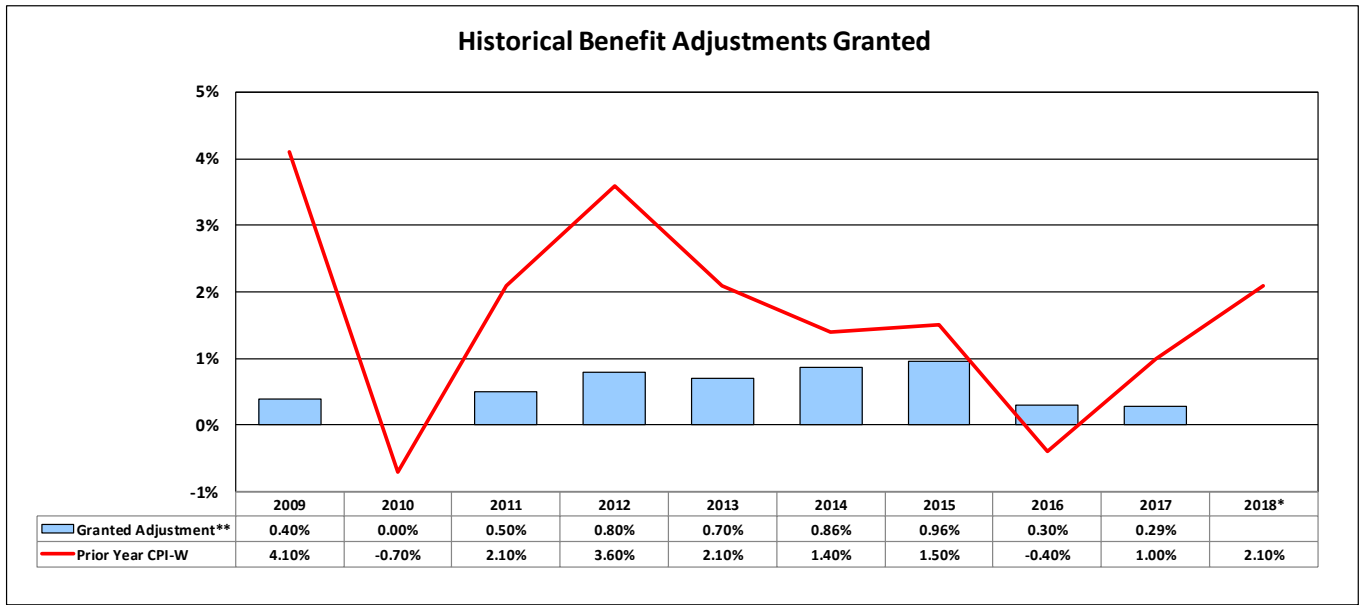
The following graph shows the historical contribution rates for employees hired on or after January 1, 1997 and for members covered by Social Security.



The cost of providing benefits is 2.69% (with no future benefit adjustments for non-totally disabled benefit recipients), therefore, the current 2.70% contribution rate is adequate to provide some level of future benefit adjustments. We recommend the Board take a conservative policy towards providing discretionary benefit adjustments over the short term.

Discretionary Benefit Adjustments

On October 1st of each year, annuitants may receive a benefit increase at the discretion of the Board of Directors. Totally disabled members and their beneficiaries receive an automatic increase each year of 3%. For other annuitants, the increase may reflect CPI, but in no case may be higher than 3%. Because the increases are purely discretionary, the valuation results in the report are shown assuming no discretionary benefit adjustments are granted to annuitants other than total disability retirees. The current 2.70% contribution could sustain a 0.01% permanent annual benefit adjustment. The cost of a one-year 0.01% benefit adjustment for current annuitants (excluding totally disabled) is \$27,000. The \$27,000 cost represents the present value of additional benefits that would be payable for the remaining lifetime of the current annuitants due to the one-time increase.



*2018 amount still to be determined.

**Total disability annuitants and their survivors receive an automatic annual Benefit Adjustment of 3.0%.

Financial Data and Experience

This section provides an analysis of the change in Plan Net Assets during the year and an estimate of the yield on mean assets of D&D. FPPA provided GRS with a summary of plan assets as of January 1, 2018. The market value of assets reported was \$403.7 million as of January 1, 2018, as compared to \$360.7 million as of January 1, 2017. 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.

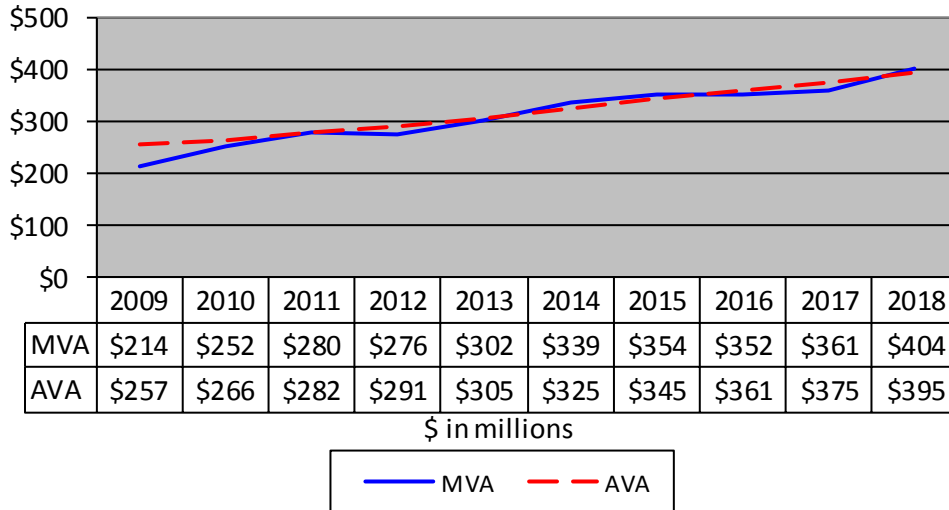
The asset valuation method uses a five-year phase in of the excess/(shortfall) between expected investment return and actual income. Expected earnings used to project the actuarial value are determined using the assumed investment return rate and the beginning of year actuarial value of assets (adjusted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

Table 7 shows the development of the actuarial value of assets. The actuarial value of assets increased from \$374.9 million to \$395.3 million since the prior valuation. This increase was more than expected and produced a gain of approximately \$2.1 million.

Effective January 1, 2012, the valuation assumed investment return was reduced from 8.0% to 7.5% per year. As indicated by item 6b of Table 8, the estimated return on mean market value was 14.73% in 2017; higher than the assumed 7.5% return. The actuarial asset value returned 8.07%, compared to 6.34% in 2016. This difference in the estimated return on market value and actuarial value illustrates the smoothing effect of the asset valuation method.

History of MVA vs AVA

As of the valuation date January 1,



AVA: Actuarial (Smoothed) Value of Assets
MVA: Market Value of Assets

Demographic Experience

During the year, the plan had more disablements than expected (67 actual vs. 45.9 expected) and less active member deaths than expected (8 actual vs. 8.2 expected). The plan had more annuitant deaths than expected (18 actual vs. 14.6 expected). The combination of these experiences created an overall liability loss.

Member Data

FPPA supplied member data as of January 1, 2018. While we did not audit this data, we did perform various tests to ensure that it was internally consistent, consistent with the prior year's data, and was reasonable overall. Information provided for active members includes: name, member ID, sex, a code indicating whether the member was active or inactive, date of birth, service, salary, accumulated member contribution, and the accumulated stabilization reserve account. For retired members, data includes: name, member ID, sex, date of birth, date of retirement, amount of benefit, a code indicating the option elected and the type of retiree (total disability retirees, occupational disability retirees, beneficiary), and if applicable, the joint pensioner's date of birth and sex.

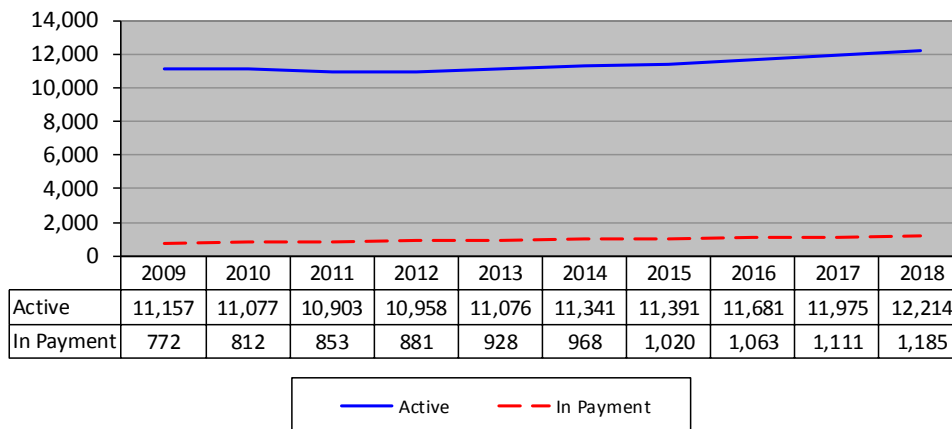
For local Money Purchase members, an array based on service was used to estimate each member's Money Purchase balance. For missing salary in the data, an array of salaries based on service was used to estimate the salary.

Table 17 shows the number of members by category (active, inactive, retired, etc.). Table 18 shows a historical summary of active member statistics, and Table 19 shows the distribution of active members by age and service.

The total payroll shown on the statistical tables is the amount that was supplied by FPPA. For the cost calculations, the pays were adjusted in accordance with the actuarial assumptions to reflect one year's salary increase.

History of Counts: Active vs In Payment

As of the valuation date January 1,



Benefit Provisions

Appendix B in Section IV includes a summary of the benefit provisions for FPPA. Highlights include:

- Pre-Retirement Death Benefits:
 - o Off-duty: 40% of the base salary paid to the member prior to death, with an additional 10% of base salary if a surviving spouse has two or more dependent children.
 - o On-duty: 70% of the base salary paid to the member prior to death.
- Disability Benefits:
 - o Total Disability: 70% of the base salary preceding disability.
 - o Permanent Occupational Disability: 50% of the base salary preceding disability.
 - o Temporary Occupational Disability: 40% of the base salary preceding disability for up to 5 years.

- Contributions: Members hired after January 1, 1997 and members covered by Social Security currently contribute 2.7% of pay.
- Benefit adjustments are granted periodically at the discretion of the FPPA Board. Total disability retirees receive an automatic increase of 3%. For other annuitants, the increase may reflect CPI, but in no case may be higher than 3%.

There are no ancillary benefits—e.g., cost of living benefits—that are currently provided by a source independent of FPPA but that might be deemed an FPPA liability if continued beyond the availability of funding by the current funding source.

Actuarial Methods and Assumptions

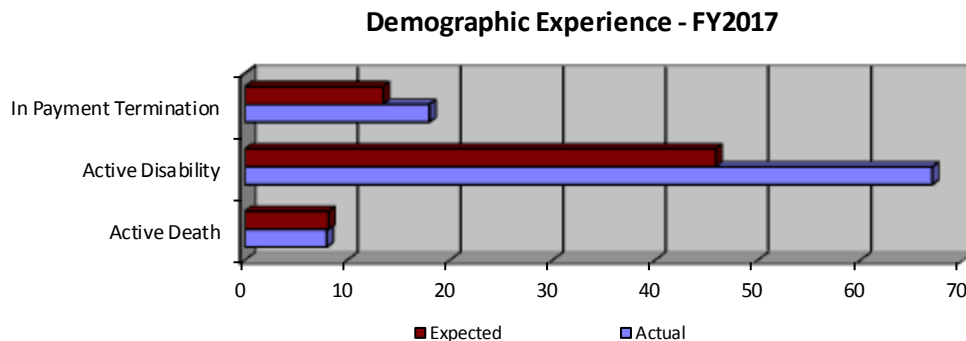
The valuation was prepared using the Aggregate Method. This is the same funding method that has been used in prior years. The asset valuation method uses a five-year phase in of the excess (shortfall) between expected investment return and actual income. See Appendix A for a complete description of this 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 as well. The economic assumptions include investment return and salary increases. Non-economic assumptions include rates of mortality, disability, and separation.

There have been no changes to the assumptions and methods since the prior valuation.

The results of the actuarial valuation are dependent on the actuarial assumptions used. Actual results can and almost certainly will differ, as actual experience deviates from the assumptions.

For FY2017, the actual salary increases were 98.1% of expected. The following charts provide a comparison of the actual experience versus the expected experience for selected assumptions.



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

GASB and Funding Progress

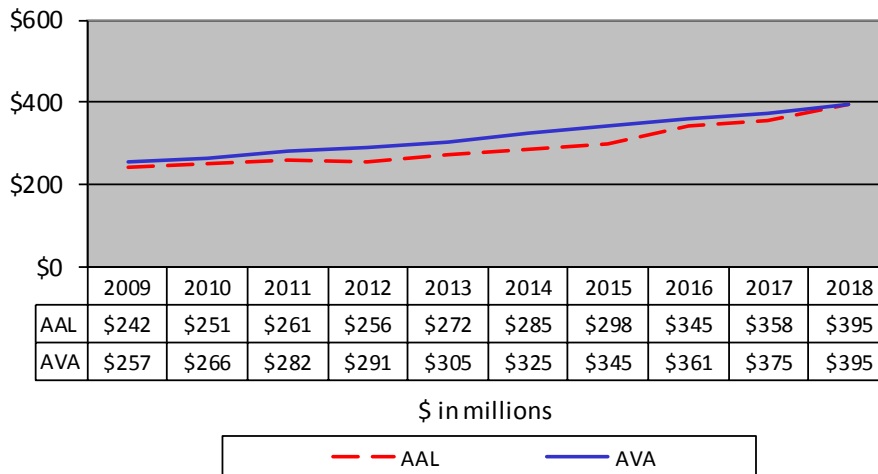
The governmental Accounting Standards Board (GASB) Statement No.74, *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans (GASB 74)*, has replaced the requirements under GASB Statement No. 43, *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans (GASB 43)*, effective for financial statements for fiscal years beginning after June 15, 2016. The governmental Accounting Standards Board (GASB) Statement No.75, *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans (GASB 75)*, has replaced the requirements under GASB Statement No. 45, *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans (GASB 45)*, effective for financial statements for fiscal years beginning after June 15, 2017.

Plan reporting information for GASB 74 can be found in the FPPA Comprehensive Annual Financial Report at FPPAco.org. There will be no employer reporting for GASB 75 as all contributions to the FPPA Statewide Death & Disability Plan are made by members or on behalf of members. Although it will no longer be required for financial reporting purpose, we have continued to include Table 11a (shows a historical summary of the funded ratios and other information for FPPA). In addition, we have included a Schedule of Funding Progress in Table 11b based on the Entry Age Normal cost method as required for plans using the Aggregate Cost Method.

For FPPA, the employer Annual Required Contribution for 2017 is 0%. For members hired on or after 1/1/97 and for members covered by Social Security the member contribution rate is 2.7% of pay. The 2.7% became effective January 1, 2017.

History of AAL vs AVA

As of the valuation date January 1,



The AAL referenced in the chart is the Actuarial Accrued Liability as referenced throughout the report.

Significant Factors Affecting Trends in Actuarial Information

Investment returns during 2017 created actuarial investment gains for the Plan. Outstanding deferred investment gains will put upward pressure on the funded ratio in future valuations if not offset by future losses.

Risk Metrics

The Statewide Death and Disability Plan provides death and disability benefits to members covered under the Statewide Death & Disability Plan, Statewide Hybrid Plan, Colorado Springs New Hire Plans, the Statewide Money Purchase Plan and Local Money Purchase and Defined Benefit Plans. The Plan is funded through payroll contributions on active member payroll for members hired on or after January 1, 1997. Benefits for members hired before 1997 were previously funded by the State. The contributions made for this group were considered to fulfill the State’s funding obligation, and no further contributions are anticipated. Accordingly, the Calculated Contribution is calculated as a percentage of contributory (post-1996 hire) payroll. As pre-1997 hires terminate and are replaced by contributory members, the contributory portion of the active population grows. This results in the contributory payroll growing faster than the liabilities and assets. This deleveraging can be observed in the historical data. Although the Plan’s contributory payroll is growing, because the Plan is funded through employee contributions, there is less tolerance for contribution rate volatility. Eventually the active population will become largely contributory and the contributory payroll will not grow at the same rate. At that point (expected to be about 10 years out), the trend will reverse and the Plan will start to become more leveraged.

Valuation Year	AVA as % of Contributory Payroll	AAL (EAN) as % of Contributory Payroll	Calculated Contribution % of Contributory Payroll	Increase in ARC if Assets Decrease 10%	Funded Ratio (EAN)	Change in Funded Ratio if Assets Decrease 10%
2008	79%	48%	0.98%	0.69%	164.5%	-16.4%
2009	61%	48%	2.31%	0.63%	126.3%	-12.6%
2010	58%	47%	2.32%	0.47%	123.3%	-12.3%
2011	60%	49%	2.23%	0.48%	122.4%	-12.2%
2012	59%	52%	1.98%	0.50%	114.6%	-11.5%
2013	58%	52%	2.05%	0.51%	111.5%	-11.1%
2014	58%	52%	1.97%	0.51%	112.3%	-11.2%
2015	58%	52%	1.89%	0.52%	110.8%	-11.1%
2016	55%	53%	2.37%	0.51%	104.0%	-10.4%
2017	54%	53%	2.48%	0.49%	100.7%	-10.1%
2018	50%	52%	2.69%	0.49%	95.8%	-9.6%

Market Value Results

Investment gains or losses are smoothed over five years, and currently, the smoothed or actuarial value of assets is 97.92% of the market value. If the Funded Ratio and Calculated Contribution had been measured using the Market Value of Assets, they would be 102.3% and 2.59% of payroll, respectively.

SECTION III

TABLES

Table 1 - Development of Unfunded Actuarial Accrued Liability

	<u>January 1, 2018</u>	<u>January 1, 2017</u>
1. Covered payroll for upcoming year	\$ 976,602,993	\$ 942,821,891
2. Present value of future pay		
a. Total	\$ 8,603,719,157	\$ 8,297,042,458
b. Contributory (Hired on or after January 1, 1997)	8,087,191,332	7,700,418,526
3. Present value of benefits for active members		
a. Future occupational disabilities	\$ 165,956,184	\$ 161,766,374
b. Future total disabilities	43,167,820	41,339,576
c. Future active deaths	37,193,909	35,871,645
d. Total for actives	\$ 246,317,913	\$ 238,977,595
4. Total present value of benefits		
a. Current disabled members	\$ 315,102,623	\$ 287,455,996
b. Current beneficiaries of deceased members	31,490,388	30,923,169
c. Active members (Item 3d)	246,317,913	238,977,595
d. Total	\$ 592,910,924	\$ 557,356,760
5. Unfunded actuarial accrued liability (UAAL)/(surplus)		
a. Present value of benefits	\$ 592,910,924	\$ 557,356,760
b. Present value of administrative costs	20,217,978	8,470,460
c. Less present value of future contributions (2.7%/2.7%)	(218,354,166)	(207,911,300)
d. Less actuarial value of assets	(395,302,474)	(374,943,903)
e. UAAL/(surplus)	\$ (527,738)	\$ (17,027,983)
6. a. Current Contribution	2.70%	2.70%
b. Calculated Contribution (Aggregate Funding) [(5.a + 5.b + 5.d)/2.b]	2.69%	2.48%
c. Difference (a. - b.)	0.01%	0.22%

Table 2 - Actuarial Present Value of Future Benefits

	<u>January 1, 2018</u>	<u>January 1, 2017</u>
1. Active members		
a. Total disability	\$ 43,167,820	\$ 41,339,576
b. Occupational disability	165,956,184	161,766,374
c. Off-duty death	25,542,957	24,720,907
d. On-duty death	<u>11,650,952</u>	<u>11,150,738</u>
e. Total	\$ 246,317,913	\$ 238,977,595
2. Members in pay status		
a. Total disabled	\$ 80,597,844	\$ 75,194,539
b. Occupationally disabled	234,504,779	212,261,457
c. Survivors	<u>31,490,388</u>	<u>30,923,169</u>
d. Total	\$ 346,593,011	\$ 318,379,165
3. Total actuarial present value of future benefits	\$ 592,910,924	\$ 557,356,760

Table 3 - Actuarial Gain/(Loss) on UAAL

For the year ending December 31,	2017	2016
1. Unfunded actuarial accrued liability (UAAL) as of January 1	\$ (17,027,983)	\$ (16,288,416)
2. Interest on UAAL for one year	(1,277,099)	(1,221,631)
3. Expected UAAL as of December 31 (1 + 2)	(18,305,082)	(17,510,047)
4. Change in Unfunded Liability due to:		
a. Benefit Changes	0	(7,724,602)
b. Method Change in allocating Administrative Expenses	11,322,068	0
5. Expected UAAL as of December 31 after changes in assumption, methods and plan provisions	(6,983,014)	(25,234,649)
6. Actual UAAL as of December 31	(527,737)	(17,027,983)
7. Actuarial gain/(loss) for the period (5 - 6)	(6,455,277)	(8,206,666)
 <u>SOURCE OF GAINS/(LOSSES)</u>		
8. Asset gain/(loss) (See Table 9)	2,097,640	(4,146,064)
9. Salary liability gain/(loss) for the period	635,273	(449,697)
10. Benefit adjustment granted as of October 1 (0.29% in 2017, 0.30% in 2016)	(705,235)	(679,703)
11. Net liability gain/(loss) for the period (7- 8 - 9 - 10)	(8,482,955)	(2,931,202)

Note: Change in the Unfunded Liability due to Benefit Changes for the year ending December 31, 2016 reflects the change in member contribution rate from 2.6% to 2.7%

Table 4 - Summary of Historical Valuation Results

As of the Valuation Date January 1,

	<u>2018</u>	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>
1. Number of members										
a. Active	12,214	11,975	11,681	11,391	11,341	11,076	10,958	10,903	11,077	11,157
b. Disabled	1,058	991	944	904	851	814	774	747	706	673
c. Survivor	127	120	119	116	117	114	107	106	106	99
d. Total	13,399	13,086	12,744	12,411	12,309	12,004	11,839	11,756	11,889	11,929
2. Covered payroll (prior year)	\$ 947,520	\$ 917,100	\$ 863,106	\$ 827,633	\$ 810,578	\$ 787,010	\$ 755,952	\$ 750,497	\$ 751,781	\$ 729,724
3. Average compensation	\$ 77,577	\$ 76,585	\$ 73,890	\$ 72,657	\$ 71,473	\$ 71,055	\$ 68,986	\$ 68,834	\$ 67,869	\$ 65,405
4. Covered payroll for upcoming year	\$ 976,603	\$ 942,822	\$ 886,802	\$ 844,536	\$ 834,268	\$ 833,177	\$ 801,017	\$ 802,802	\$ 806,605	\$ 785,321
5. Actuarial value of assets	\$ 395,302	\$ 374,944	\$ 361,070	\$ 345,009	\$ 325,181	\$ 305,455	\$ 290,988	\$ 281,577	\$ 266,478	\$ 257,279
6. Market value of assets	\$ 403,693	\$ 360,747	\$ 351,520	\$ 353,776	\$ 339,347	\$ 301,653	\$ 275,873	\$ 279,882	\$ 251,923	\$ 214,400
7. Present value of benefits										
a. Actives	\$ 246,318	\$ 238,978	\$ 225,012	\$ 201,711	\$ 203,254	\$ 198,232	\$ 192,101	\$ 214,708	\$ 218,346	\$ 217,161
b. Disabled	315,103	287,456	265,786	243,179	221,357	204,847	189,203	169,063	155,625	144,846
c. Survivors	31,490	30,923	30,430	25,703	26,290	25,700	23,036	22,180	22,413	20,894
d. Total	\$ 592,911	\$ 557,357	\$ 521,228	\$ 470,593	\$ 450,900	\$ 428,778	\$ 404,340	\$ 405,952	\$ 396,385	\$ 382,901
8. Calculated Contribution	2.69%	2.48%	2.37%	1.89%	1.97%	2.05%	1.98%	2.23%	2.32%	2.31%

\$ amounts in '000s

Table 5 - Allocation of Plan Assets at Fair Value

	Actual Allocation January 1, 2018	Target Allocation
1. Global Equity	38.3%	37.0%
2. Equity Long/Short	8.9%	9.0%
3. Absolute Return	9.4%	9.0%
4. Illiquid Alternatives	22.3%	24.0%
5. Managed Futures	4.0%	4.0%
6. Fixed Income	15.3%	15.0%
7. Cash	<u>1.8%</u>	<u>2.0%</u>
	100.0%	100.0%

Asset Allocation as of January 1, 2018

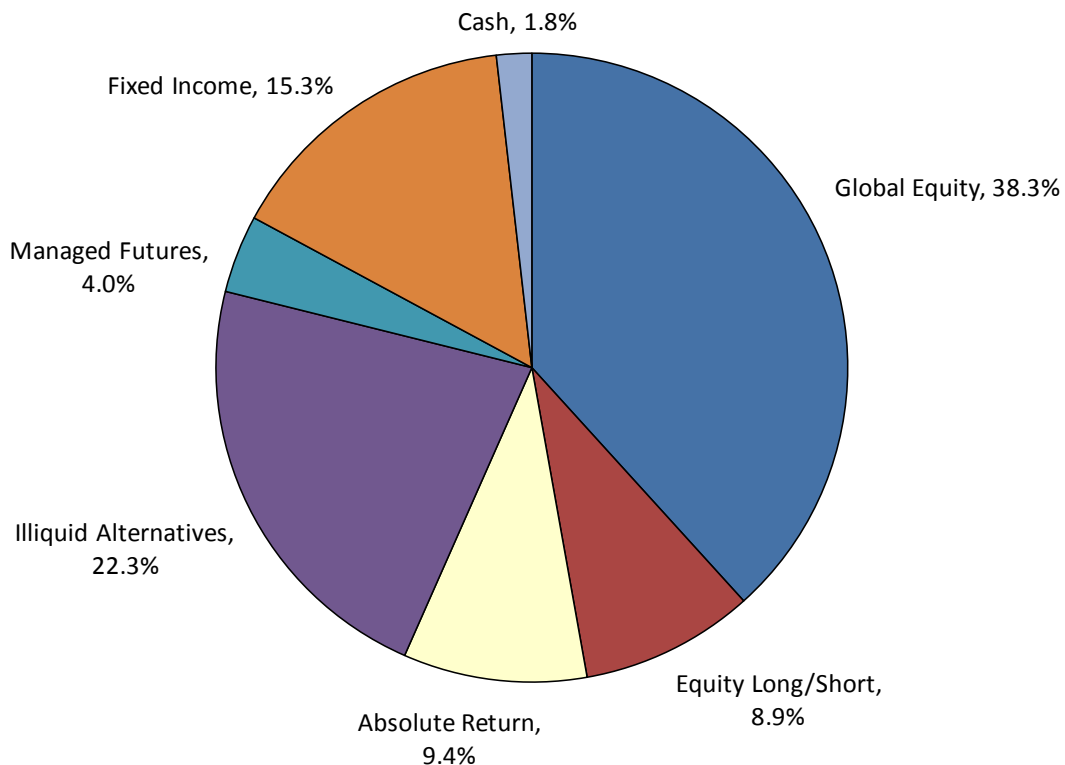


Table 6 - Reconciliation of Plan Net Assets

	Year Ending	
	December 31, 2017	December 31, 2016
1. Market value of assets at January 1	\$ 360,747,296	\$ 351,519,816
2. Revenue for the year		
a. Contributions		
i. Member contributions	\$ 3,547,592	\$ 3,170,693
ii. Employer contributions *	16,987,830	15,045,423
iii. Contributions from the SWDD Plan	0	0
b. Net investment income		
i. Interest	\$ 1,032,766	\$ 972,037
ii. Dividends	2,736,311	2,726,640
iii. Net change in accrued income	227,096	(16,302)
iv. Unrealized gain/(loss)	31,704,177	8,671,163
v. Realized gain/(loss)	17,155,015	7,842,888
vi. Investment expense	(3,641,523)	(3,693,993)
vii. Other Income	3,235,375	1,458,275
c. Total revenue	\$ 72,984,639	\$ 36,176,824
3. Expenditures for the year		
a. Benefit payments and refunds	\$ (28,157,074)	\$ (26,187,814)
b. Administrative expense	(1,881,829)	(761,530)
c. Total expenditures	\$ (30,038,903)	\$ (26,949,344)
4. Increase in net assets (Item 2c + Item 3c)	\$ 42,945,736	\$ 9,227,480
5. Market value of assets at December 31 (Item 1 + Item 4)	\$ 403,693,032	\$ 360,747,296

*All contributions are made by members or on behalf of members

Table 7 - Development of Actuarial Value of Assets

1.	Actuarial value of assets at beginning of year	\$	374,943,903
2.	Net new investments		
	a. Contributions	\$	20,535,422
	b. Benefit payments		(28,157,074)
	c. Administrative expenses		(1,881,829)
	d. Net cash flow	\$	(9,503,481)
3.	Assumed investment return rate for fiscal year		7.5%
4.	Assumed investment return for fiscal year	\$	27,764,412
5.	Expected Actuarial Value at end of year	\$	393,204,834
6.	Market value of assets at end of year	\$	403,693,032
7.	Excess return (6-5)	\$	10,488,198
8.	Development of amounts to be recognized as of December 31, 2017:		

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)
2013	\$ 0	\$ 0	\$ 0	1	\$ 0	\$ 0
2014	0	0	0	2	0	0
2015	(7,162,945)	7,162,945	0	3	0	0
2016	(7,033,662)	7,033,662	0	4	0	0
2017	<u>24,684,805</u>	<u>(14,196,607)</u>	<u>10,488,198</u>	5	<u>2,097,640</u>	<u>8,390,558</u>
Total	\$ 10,488,198	\$ 0	\$ 10,488,198		\$ 2,097,640	\$ 8,390,558

9.	Actuarial value of assets as of December 31, 2017 (Item 6 - Item 8)	\$	395,302,474
10.	Ratio of actuarial value to market value		97.9%

Amounts in column (1) for fiscal years ending 2013 through 2016 are from the prior valuation. The column (1) amount for fiscal year 2017 is developed using item 7 less the total of column (1) for fiscal years ending 2013 through 2016. To the extent possible, the 2017 excess or shortfall is used to reduce prior bases. In this case, both the 2015 and 2016 base were offset by the gains in 2017. The fiscal year 2013 and 2014 bases are \$0 because they were previously offset.

Table 8 - Investment Yields

Item	Market Value	Actuarial Value
1. Assets as of January 1, 2017 (A)	\$ 360,747,296	\$ 374,943,903
2. Contributions during FY17	20,535,422	20,535,422
3. Benefit payments and administrative expenses during FY17	(30,038,903)	(30,038,903)
4. Investment return during FY17	<u>52,449,217</u>	<u>29,862,052</u>
5. Assets as of January 1, 2018 (B): (1 + 2 + 3 + 4)	\$ 403,693,032	\$ 395,302,474
6. Approximate rate of return on average invested assets		
a. Net investment income (I)	\$ 52,449,217	\$ 29,862,052
b. Estimated return based on $(2I / (A + B - I))$	14.73%	8.07%

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

Item	Valuation as of January 1, 2018	Valuation as of January 1, 2017
1. Actuarial assets, prior valuation	\$ 374,943,903	\$ 361,070,410
2. Total contributions since prior valuation	\$ 20,535,422	\$ 18,216,116
3. Benefit payments and administrative expenses since prior valuation	\$ (30,038,903)	\$ (26,949,344)
4. Assumed net investment income at 7.5%		
a. Beginning assets	\$ 28,120,793	\$ 27,080,281
b. Contributions	770,078	683,104
c. Benefit payments and administrative expenses	<u>(1,126,459)</u>	<u>(1,010,600)</u>
d. Total	\$ 27,764,412	\$ 26,752,785
5. Expected actuarial assets (1 + 2 + 3 + 4d)	\$ 393,204,834	\$ 379,089,967
6. Actual actuarial assets, this valuation	\$ 395,302,474	\$ 374,943,903
7. Asset gain/(loss) since prior valuation (6 - 5)	\$ 2,097,640 Gain	\$ (4,146,064) Loss

Table 10 - History of Investment Return Rates

For Fiscal Year Ending	Market Value	Actuarial Value
December 31, 2008	(29.34%)	(13.20%)
December 31, 2009	19.58%	5.19%
December 31, 2010	13.29%	7.68%
December 31, 2011	0.52%	5.33%
December 31, 2012	11.60%	7.06%
December 31, 2013	14.80%	8.67%
December 31, 2014	6.45%	8.41%
December 31, 2015	1.40%	6.80%
December 31, 2016	5.17%	6.34%
December 31, 2017	14.73%	8.07%
Average Returns		
Last 5 Years	8.38%	7.65%
Last 10 Years	4.85%	4.83%

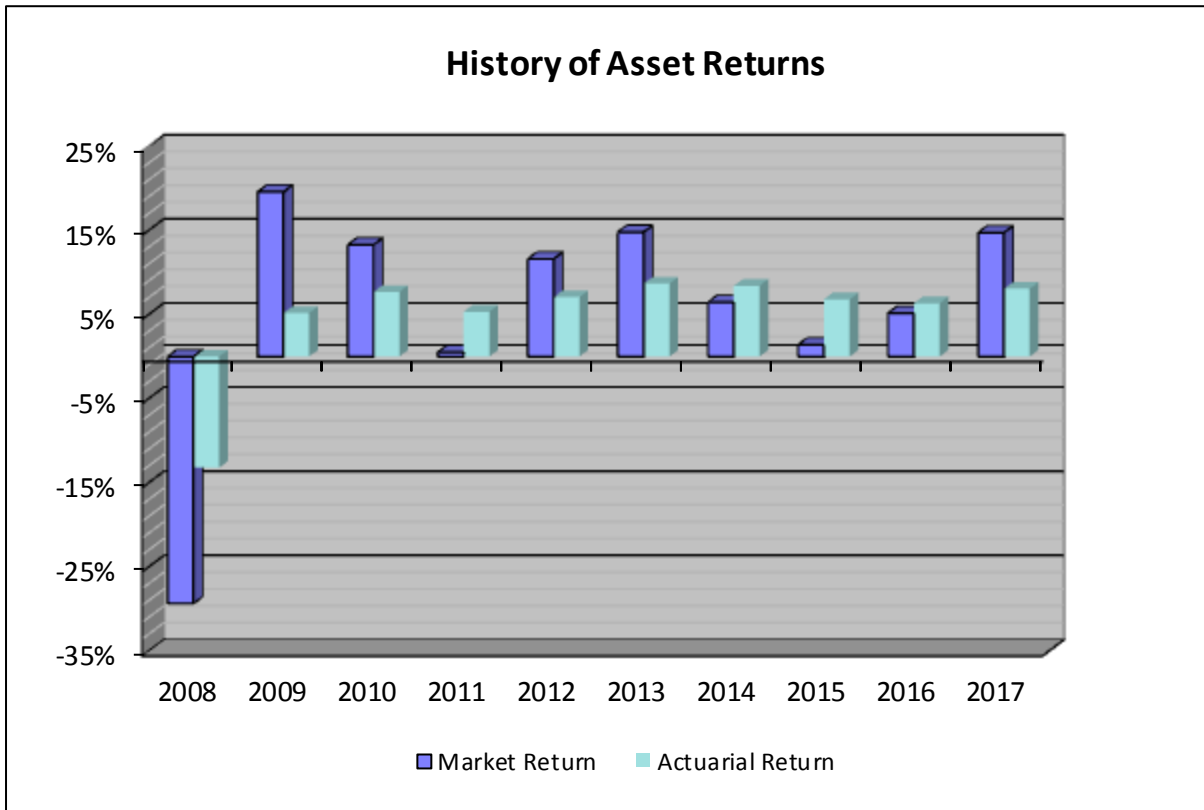


Table 11a - Schedule of Funding Progress
Based on the Aggregate Funding Method

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, 2007	\$ 274,091,581	\$ 258,243,478	\$ (15,848,104)	106.1%	\$ 631,667,107	(2.5%)
January 1, 2008	300,642,721	223,999,678	(76,643,044)	134.2%	679,223,009	(11.3%)
January 1, 2009	257,279,496	241,813,411	(15,466,086)	106.4%	740,172,854	(2.1%)
January 1, 2010	266,477,875	250,709,436	(15,768,440)	106.3%	758,113,476	(2.1%)
January 1, 2011	281,577,454	260,688,472	(20,888,983)	108.0%	750,497,200	(2.8%)
January 1, 2012	290,988,339	255,841,269	(35,147,071)	113.7%	755,952,497	(4.6%)
January 1, 2013	305,454,945	272,350,253	(33,104,693)	112.2%	787,009,650	(4.2%)
January 1, 2014	325,180,768	284,820,249	(40,360,519)	114.2%	810,578,220	(5.0%)
January 1, 2015	345,009,408	298,128,930	(46,880,478)	115.7%	827,633,440	(5.7%)
January 1, 2016	361,070,410	344,781,994	(16,288,416)	104.7%	863,105,687	(1.9%)
January 1, 2017	374,943,903	357,915,920	(17,027,983)	104.8%	917,099,955	(1.9%)
January 1, 2018	395,302,474	394,774,736	(527,738)	100.1%	947,520,430	(0.1%)

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 11b - Schedule of Funding Progress
Based on the Entry Age Normal Funding Method

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, 2009	\$ 257,279,496	\$ 203,673,786	\$ (53,605,710)	126.3%	\$ 740,172,854	(7.2%)
January 1, 2010	266,477,875	216,103,895	(50,373,980)	123.3%	758,113,476	(6.6%)
January 1, 2011	281,577,454	229,959,016	(51,618,438)	122.4%	750,497,200	(6.9%)
January 1, 2012	290,988,339	253,869,640	(37,118,699)	114.6%	755,952,497	(4.9%)
January 1, 2013	305,454,945	274,068,253	(31,386,692)	111.5%	787,009,650	(4.0%)
January 1, 2014	325,180,768	289,577,412	(35,603,356)	112.3%	810,578,220	(4.4%)
January 1, 2015	345,009,408	311,334,019	(33,675,389)	110.8%	827,633,440	(4.1%)
January 1, 2016	361,070,410	347,242,942	(13,827,468)	104.0%	863,105,687	(1.6%)
January 1, 2017	374,943,903	372,201,460	(2,742,443)	100.7%	917,099,955	(0.3%)
January 1, 2018	395,302,474	412,597,445	17,294,972	95.8%	947,520,430	1.8%

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

Valuation Date	Aggregated Accrued Liabilities for				Portion of Accrued Liabilities Covered by Reported Assets		
	Active Members Contribution	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, 2006	\$ 0	\$ 135,159	\$ 123,568	\$ 249,299	100%	100%	92%
January 1, 2007	0	143,706	114,537	274,092	100%	100%	100%
January 1, 2008	0	154,614	69,386	300,643	100%	100%	100%
January 1, 2009	0	165,740	76,074	257,279	100%	100%	100%
January 1, 2010	0	178,039	72,671	266,478	100%	100%	100%
January 1, 2011	0	191,243	69,445	281,577	100%	100%	100%
January 1, 2012	0	212,239	43,602	290,988	100%	100%	100%
January 1, 2013	0	230,546	41,804	305,455	100%	100%	100%
January 1, 2014	0	247,646	37,174	325,181	100%	100%	100%
January 1, 2015	0	268,883	29,246	345,009	100%	100%	100%
January 1, 2016	0	296,216	48,566	361,070	100%	100%	100%
January 1, 2017	0	318,379	39,537	374,944	100%	100%	100%
January 1, 2018	0	346,593	48,182	395,302	100%	100%	100%

\$ amounts in '000s

Table 13 - Cash Flow Analysis

Year Ending December 31,	Contributions for the Year	Expenditures During the Year				External Cash Flow for the Year	Market Value of Assets	External Cash Flow as Percent of Market Value
		Benefit Payments	Refund of Contributions	Expenses	Total			
2006	\$ 8,285	\$ (13,007)	\$ 0	\$ (1,796)	\$ (14,803)	\$ (6,518)	\$ 286,240	(2.3%)
2007	9,902	(13,742)	0	(2,102)	(15,844)	(5,942)	308,170	(1.9%)
2008	10,963	(14,887)	0	(2,192)	(17,079)	(6,116)	214,400	(2.9%)
2009	11,957	(16,010)	0	(1,756)	(17,766)	(5,809)	251,923	(2.3%)
2010	12,259	(17,435)	0	(1,963)	(19,398)	(7,139)	279,882	(2.6%)
2011	12,813	(18,265)	0	(2,175)	(20,439)	(7,627)	275,873	(2.8%)
2012	13,612	(19,482)	0	(2,616)	(22,098)	(8,486)	301,653	(2.8%)
2013	14,570	(21,052)	0	(3,669)	(24,721)	(10,151)	339,347	(3.0%)
2014	15,509	(22,720)	0	(3,791)	(26,511)	(11,003)	353,776	(3.1%)
2015	16,938	(24,097)	0	(4,247)	(28,344)	(11,406)	351,520	(3.2%)
2016	18,216	(26,188)	0	(4,456)	(30,643)	(12,427)	360,747	(3.4%)
2017	20,535	(28,157)	0	(5,604)	(33,761)	(13,226)	403,693	(3.3%)
2018*	22,401	(29,976)	0	(5,800)	(35,776)	(13,375)	420,093	(3.2%)
2019*	23,503	(31,821)	0	(6,003)	(37,824)	(14,321)	436,742	(3.3%)
2020*	24,478	(33,737)	0	(6,214)	(39,951)	(15,473)	453,444	(3.4%)

Results for 2018, 2019, & 2020 are based on expected contributions, expected benefit payments, and assumed investment return of 7.5%

Expected contributions are based on applicable employee rate of 2.7% and 3.5% annual payroll growth

Expected benefit payments are based on the current plan benefits and expected retirements, terminations, and mortality

Assets are assumed to increase at the annual return of 7.5% with all cash flow occurring in the middle of the year

\$ amounts in '000s

Table 14 - Membership Data

	<u>January 1, 2018</u>	<u>January 1, 2017</u>	<u>January 1, 2016</u>
1. Active members			
a. Number	12,214	11,975	11,681
b. Total payroll	\$ 947,520,430	\$ 917,099,955	\$ 863,105,687
c. Average annual salary	\$ 77,577	\$ 76,585	\$ 73,890
d. Average age	41.4	41.5	41.7
e. Average service	11.0	11.1	11.3
2. Disabled members and beneficiaries			
a. Number	1,058	991	944
b. Total annual benefits	\$ 26,013,174	\$ 23,703,863	\$ 22,002,243
c. Average annual benefit	\$ 24,587	\$ 23,919	\$ 23,307
d. Average age	58.0	57.8	57.6
3. Survivors of deceased active members			
a. Number	127	120	119
b. Total annual benefits	\$ 3,046,277	\$ 2,876,276	\$ 2,892,842
c. Average annual benefit	\$ 23,986	\$ 23,969	\$ 24,310
d. Average age	54.1	54.9	55.0

Table 15 - Historical Summary of Active Member Data

<u>Valuation Date</u>	<u>Active Count</u>	<u>Average Age</u>	<u>Average Service</u>	<u>Covered Payroll</u>	<u>Average Annual Salary</u>	<u>Percent Change in Average Salary</u>
January 1, 2006	10,338	39.7	10.1	\$ 596,231,150	\$57,674	3.28%
January 1, 2007	10,600	39.9	10.2	623,699,534	58,840	2.02%
January 1, 2008	10,971	40.0	10.1	668,502,284	60,934	3.56%
January 1, 2009	11,157	40.3	10.4	729,723,656	65,405	7.34%
January 1, 2010	11,077	40.8	10.9	751,781,464	67,869	3.77%
January 1, 2011	10,903	41.4	11.3	750,497,200	68,834	1.42%
January 1, 2012	10,958	41.6	11.5	755,952,497	68,986	0.22%
January 1, 2013	11,076	41.8	11.7	787,009,650	71,055	3.00%
January 1, 2014	11,341	41.7	11.5	810,578,220	71,473	0.59%
January 1, 2015	11,391	41.8	11.5	827,633,440	72,657	1.66%
January 1, 2016	11,681	41.7	11.3	863,105,687	73,890	1.70%
January 1, 2017	11,975	41.5	11.1	917,099,955	76,585	3.65%
January 1, 2018	12,214	41.4	11.0	947,520,430	77,577	1.30%

Table 16 - Distribution of Active Members by Age and by Years of Service
As of December 31, 2017

Attained Age	Years of Credited Service												Total
	Less than 1	1-2	2-3	3-4	4-5	5-9	10-14	15-19	20-24	25-29	30-34	35 & Over	
	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	Count & Avg. Comp.	
Under 25	184 \$48,375	91 \$53,155	24 \$53,198	5 \$53,110									304 \$50,265
25-29	429 \$51,710	317 \$55,695	202 \$58,113	164 \$62,963	103 \$69,271	79 \$71,939							1,294 \$57,745
30-34	320 \$53,430	329 \$57,888	259 \$61,143	192 \$66,626	193 \$70,995	475 \$74,560	145 \$82,589						1,913 \$65,794
35-39	157 \$53,778	133 \$58,309	140 \$65,342	142 \$69,499	159 \$74,392	491 \$76,679	624 \$83,432	106 \$88,187					1,952 \$74,848
40-44	70 \$61,673	79 \$59,238	69 \$64,630	82 \$69,690	73 \$72,641	287 \$75,867	613 \$84,131	563 \$89,469	52 \$96,560	1 \$95,737			1,889 \$81,158
45-49	34 \$62,576	54 \$62,926	48 \$70,706	49 \$69,636	32 \$80,008	211 \$76,627	483 \$83,462	772 \$88,809	431 \$96,039	52 \$100,076			2,166 \$86,117
50-54	28 \$66,045	28 \$67,741	23 \$73,864	26 \$69,313	24 \$76,994	88 \$78,643	227 \$84,048	369 \$88,915	333 \$94,686	285 \$100,622	37 \$108,027		1,468 \$89,992
55-59	16 \$74,261	12 \$66,169	17 \$72,302	12 \$81,751	15 \$87,733	40 \$78,769	79 \$84,610	140 \$90,052	142 \$94,253	191 \$96,414	129 \$106,350	28 \$94,610	821 \$92,714
60-64	6 \$82,635	8 \$86,289	7 \$90,584	8 \$83,337	4 \$70,274	19 \$73,587	22 \$88,420	40 \$86,754	42 \$91,033	46 \$96,802	53 \$97,260	67 \$100,365	322 \$92,351
65 & Over	3 \$63,648	1 \$56,030	1 \$34,070	5 \$78,891	4 \$85,480	7 \$82,424	10 \$93,699	13 \$92,200	5 \$97,133	5 \$115,028	8 \$85,982	23 \$98,727	85 \$91,169
Total	1,247 \$53,564	1,052 \$57,802	790 \$62,594	685 \$67,480	607 \$73,007	1,697 \$75,862	2,203 \$83,780	2,003 \$89,049	1,005 \$95,162	580 \$99,000	227 \$103,783	118 \$98,680	12,214 \$77,577
Average:		Age:	41.4				Number of participants:				Males:	11,027	
		Service:	11.0								Females:	1,187	

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

Year Ended	Added to Rolls*		Removed from Rolls		Rolls-End of Year		% Increase in Annual Benefit	Average Annual Benefit
	Number	Annual Benefit	Number	Annual Benefit	Number	Annual Benefit		
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
December 31, 2005	49	\$ 1,349,934	17	\$ 270,411	689	\$ 12,516,017	9.44%	\$ 18,165
December 31, 2006	78	2,061,528	11	223,439	724	13,274,583	6.06%	18,335
December 31, 2007	39	1,264,925	16	258,356	747	14,281,152	7.58%	19,118
December 31, 2008	45	1,259,221	20	339,442	772	15,200,931	6.44%	19,690
December 31, 2009	54	1,537,193	14	312,334	812	16,425,790	8.06%	20,229
December 31, 2010	50	1,366,173	9	185,774	853	17,606,189	7.19%	20,640
December 31, 2011	46	1,239,908	18	414,489	881	18,431,608	4.69%	20,921
December 31, 2012	56	1,721,508	9	166,231	928	19,986,885	8.44%	21,538
December 31, 2013	56	1,853,252	16	341,854	968	21,498,284	7.56%	22,209
December 31, 2014	67	2,082,872	15	299,192	1,020	23,281,964	8.30%	22,825
December 31, 2015	52	1,797,136	9	184,015	1,063	24,895,085	6.93%	23,420
December 31, 2016	68	2,098,542	20	413,487	1,111	26,580,140	6.77%	23,925
December 31, 2017	92	2,807,643	18	328,332	1,185	29,059,451	9.33%	24,523

*Includes benefit adjustments

Table 18 - Summary of Members and Adjusted Payroll by Employer

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
550	ADAMS COUNTY FPD	0	\$ 0	97	\$ 8,388,418	97	\$ 8,388,418
3	ALAMOSA	24	1,255,598	0	0	24	1,255,598
4	ALMA	1	51,958	0	0	1	51,958
5	ANTONITO	1	31,200	0	0	1	31,200
7	ARVADA	173	14,689,319	0	0	173	14,689,319
501	ARVADA FPD	0	0	158	13,640,427	158	13,640,427
8	ASPEN	24	1,802,563	0	0	24	1,802,563
711	ASPEN FPD	0	0	2	256,882	2	256,882
712	AULT FPD	0	0	5	200,100	5	200,100
9	AULT	5	244,377	0	0	5	244,377
10	AURORA	699	58,461,708	351	26,975,662	1,050	85,437,370
11	AVON	18	1,337,212	0	0	18	1,337,212
12	BASALT	11	901,515	0	0	11	901,515
719	BASALT & RURAL FPD	0	0	9	779,096	9	779,096
13	BAYFIELD	8	438,601	0	0	8	438,601
718	BENNETT FPD #7	0	0	17	797,110	17	797,110
503	BERTHOUD FPD	0	0	26	1,635,261	26	1,635,261
538	BEULAH FIRE PROTECTION & AMBULANCE DISTRICT	0	0	1	56,784	1	56,784
580	BLACK FOREST FIRE RESCUE	0	0	11	637,484	11	637,484
723	BLACK HAWK	0	0	19	1,627,184	19	1,627,184
18	BLANCA	1	37,963	0	0	1	37,963
22	BOULDER	171	15,461,837	117	10,916,949	288	26,378,786
726	BOULDER MOUNTAIN FPD	0	0	4	215,891	4	215,891
730	BOULDER RURAL FPD	0	0	15	1,190,307	15	1,190,307
7700	BRIGGSDALE FPD	0	0	1	45,975	1	45,975
326	BRIGHTON	63	4,710,660	0	0	63	4,710,660
26	BRIGHTON (GREATER) FPD	0	0	70	5,144,989	70	5,144,989
504	BROADMOOR FPD	0	0	4	292,999	4	292,999
27	BROOMFIELD	158	13,560,200	0	0	158	13,560,200
28	BRUSH	9	453,130	0	0	9	453,130

Table 18 (continued) - Summary of Members and Adjusted Payroll by Employer

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
29	BUENA VISTA	9	\$ 480,846	2	\$ 91,970	11	\$ 572,816
735	BYERS FPD #9	0	0	1	40,000	1	40,000
33	CANON CITY	35	1,756,151	0	0	35	1,756,151
533	CANON CITY AREA FPD	0	0	31	2,126,489	31	2,126,489
740	CARBONDALE & RURAL FPD	0	0	18	1,255,952	18	1,255,952
35	CASTLE ROCK	0	0	79	6,758,977	79	6,758,977
37	CENTER	7	278,510	0	0	7	278,510
38	CENTRAL CITY	0	0	1	83,490	1	83,490
749	CHAFFEE COUNTY FPD	0	0	5	247,371	5	247,371
505	CHERRY HILLS FPD (SOUTH METRO FIRE RESCUE)	0	0	3	333,573	3	333,573
40	CHERRY HILLS VILLAGE	23	1,943,617	0	0	23	1,943,617
754	CIMARRON HILLS FPD	0	0	15	915,800	15	915,800
7125	CLEAR CREEK FIRE AUTHORITY	0	0	4	235,892	4	235,892
509	CLIFTON FPD	0	0	16	979,079	16	979,079
757	COAL CREEK CANYON FPD	0	0	1	67,243	1	67,243
44	COLLBRAN MARSHALS	1	53,357	0	0	1	53,357
531	COLORADO RIVER FPD	0	0	56	3,534,872	56	3,534,872
45	COLORADO SPRINGS	636	47,347,565	388	31,266,769	1,024	78,614,334
46	COLUMBINE VALLEY	6	359,747	0	0	6	359,747
47	COMMERCE CITY	91	7,401,912	0	0	91	7,401,912
48	CORTEZ	31	1,590,110	0	0	31	1,590,110
765	CORTEZ FPD	0	0	14	548,917	14	548,917
772	CRESTED BUTTE FPD	0	0	11	555,735	11	555,735
774	CRIPPLE CREEK	0	0	13	732,321	13	732,321
57	DACONO	9	549,738	0	0	9	549,738
779	DEBEQUE FPD	0	0	7	509,648	7	509,648
58	DEBEQUE	4	229,817	0	0	4	229,817
60	DEL NORTE	3	137,601	0	0	3	137,601
61	DELTA	15	856,110	0	0	15	856,110
62	DENVER	1,416	124,348,761	900	80,066,116	2,316	204,414,877

Table 18 (continued) - Summary of Members and Adjusted Payroll by Employer

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
63	DILLON	9	\$ 668,048	0	\$ 0	9	\$ 668,048
64	DINOSAUR	1	42,000	0	0	1	42,000
566	DONALD WESCOTT FPD	0	0	15	944,288	15	944,288
67	DURANGO	54	3,575,518	0	0	54	3,575,518
567	DURANGO FPD	0	0	68	4,698,200	68	4,698,200
522	EAGLE RIVER FPD	0	0	63	4,600,842	63	4,600,842
507	EAST GRAND FPD #4	0	0	5	302,782	5	302,782
795	EATON FPD	0	0	14	657,815	14	657,815
73	EDGEWATER	19	1,209,233	0	0	19	1,209,233
74	ELIZABETH	7	422,340	0	0	7	422,340
515	ELIZABETH FPD	0	0	17	1,016,527	17	1,016,527
7102	ELK CREEK FPD	0	0	13	749,572	13	749,572
75	EMPIRE	1	52,000	0	0	1	52,000
76	ENGLEWOOD	74	6,139,118	0	0	74	6,139,118
77	ERIE	29	2,110,882	0	0	29	2,110,882
523	ESTES VALLEY FPD	0	0	2	169,999	2	169,999
79	EVANS	35	2,693,705	0	0	35	2,693,705
579	EVANS FPD	0	0	17	994,258	17	994,258
7109	EVERGREEN FPD	0	0	1	95,694	1	95,694
510	FAIRMOUNT FPD	0	0	25	1,669,751	25	1,669,751
80	FAIRPLAY MARSHALLS	1	50,491	0	0	1	50,491
7112	FALCON FPD	0	0	22	1,263,399	22	1,263,399
81	FEDERAL HEIGHTS	22	1,479,982	17	1,080,356	39	2,560,338
82	FIRESTONE	23	1,690,465	0	0	23	1,690,465
85	FLORENCE	13	585,369	0	0	13	585,369
7222	FOOTHILLS FIRE & RESCUE	0	0	3	176,153	3	176,153
86	FORT COLLINS	235	20,482,105	1	92,898	236	20,575,003
7122	FORT LEWIS MESA FPD	0	0	2	120,476	2	120,476
87	FORT LUPTON	15	970,854	0	0	15	970,854
7123	FORT LUPTON FPD	0	0	25	1,418,400	25	1,418,400

Table 18 (continued) - Summary of Members and Adjusted Payroll by Employer

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
88	FORT MORGAN	24	\$ 1,359,566	0	\$ 0	24	\$ 1,359,566
89	FOUNTAIN	50	3,317,126	28	1,754,070	78	5,071,196
90	FOWLER	2	73,599	0	0	2	73,599
511	FRANKTOWN FPD	0	0	20	1,184,266	20	1,184,266
592	FREDERICK FIRESTONE FPD	0	0	42	2,814,686	42	2,814,686
93	FRISCO	12	740,996	0	0	12	740,996
7131	FRONT RANGE FIRE RESCUE FPD	0	0	28	1,805,592	28	1,805,592
94	FRUITA	17	962,546	0	0	17	962,546
95	GARDEN CITY	4	195,975	0	0	4	195,975
7135	GATEWAY-UNAWEEP FPD	0	0	1	65,000	1	65,000
7136	GENESEE FPD	0	0	2	159,744	2	159,744
97	GEORGETOWN	3	188,743	0	0	3	188,743
99	GLENDALE	29	2,054,761	0	0	29	2,054,761
100	GLENWOOD SPRINGS	24	1,696,464	26	1,763,327	50	3,459,791
101	GOLDEN	45	3,683,905	8	660,644	53	4,344,549
102	GRANADA	1	29,664	0	0	1	29,664
7147	GRAND FPD #1	0	0	3	185,318	3	185,318
104	GRAND JUNCTION	108	8,373,688	110	8,240,505	218	16,614,193
7149	GRAND LAKE FPD	0	0	7	359,060	7	359,060
7150	GRAND VALLEY FPD	0	0	19	1,554,073	19	1,554,073
7153	GREATER EAGLE FPD	0	0	14	827,034	14	827,034
107	GREELEY	148	12,160,994	97	7,658,078	245	19,819,072
512	GREEN MOUNTAIN FALLS-CHIPITA PARK FPD	0	0	1	51,607	1	51,607
109	GREENWOOD VILLAGE	60	4,808,622	0	0	60	4,808,622
7156	GYPSSUM FPD	0	0	6	400,660	6	400,660
7158	HARTSEL FPD	0	0	2	105,504	2	105,504
115	HAXTUN	3	131,020	0	0	3	131,020
119	HOLYOKE	4	178,773	0	0	4	178,773
7176	HUDSON FPD	0	0	20	1,044,240	20	1,044,240
124	HUGO	2	75,720	0	0	2	75,720

Table 18 (continued) - Summary of Members and Adjusted Payroll by Employer

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
125	IDAHO SPRINGS	8	\$ 454,891	0	\$ 0	8	\$ 454,891
126	IGNACIO	7	447,184	0	0	7	447,184
7185	INDIAN HILLS FPD	0	0	1	43,260	1	43,260
7187	INTER-CANYON FPD	0	0	1	85,302	1	85,302
7191	JEFFERSON-COMO FPD	0	0	5	239,756	5	239,756
129	JOHNSTOWN	18	1,088,944	0	0	18	1,088,944
132	KERSEY	4	187,487	0	0	4	187,487
7198	KIOWA FPD	0	0	2	97,399	2	97,399
5136	KREMMLING FPD	0	0	2	111,183	2	111,183
138	LA JARA	3	147,411	0	0	3	147,411
139	LA JUNTA	13	578,138	8	330,895	21	909,033
144	LA SALLE	8	469,798	0	0	8	469,798
7211	LA SALLE FPD	0	0	11	682,046	11	682,046
146	LA VETA	2	73,128	0	0	2	73,128
137	LAFAYETTE	40	3,099,034	23	1,635,372	63	4,734,406
7206	LAKE GEORGE FPD	0	0	1	45,975	1	45,975
263	LAKESIDE	4	220,480	0	0	4	220,480
143	LAMAR	15	795,370	9	423,221	24	1,218,591
141	LARKSPUR FPD	0	0	17	1,002,077	17	1,002,077
147	LEADVILLE	9	399,476	11	594,984	20	994,460
574	LEFTHAND FPD	0	0	3	225,999	3	225,999
149	LITTLETON	76	6,459,205	158	13,793,939	234	20,253,144
150	LOCHBUIE	9	552,226	0	0	9	552,226
214	LOG LANE VILLAGE	3	123,966	0	0	3	123,966
268	LONE TREE	50	3,930,653	0	0	50	3,930,653
151	LONGMONT	140	12,018,449	86	7,721,432	226	19,739,881
578	LOS PINOS FPD	0	0	18	1,010,003	18	1,010,003
153	LOVELAND	102	8,732,854	0	0	102	8,732,854
2153	LOVELAND FRA	0	0	85	6,599,430	85	6,599,430
7226	LOWER VALLEY FPD	0	0	13	715,925	13	715,925

Table 18 (continued) - Summary of Members and Adjusted Payroll by Employer

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
7227	LYONS FPD	0	\$ 0	1	\$ 78,207	1	\$ 78,207
155	MANASSA	1	43,700	0	0	1	43,700
157	MANITOU SPRINGS	13	732,357	6	350,463	19	1,082,820
160	MEAD	4	260,997	0	0	4	260,997
163	MILLIKEN	8	467,463	0	0	8	467,463
166	MONTE VISTA	13	532,043	0	0	13	532,043
167	MONTROSE	39	2,314,480	0	0	39	2,314,480
537	MONTROSE FPD	0	0	33	2,352,292	33	2,352,292
170	MOUNTAIN VIEW	8	440,400	0	0	8	440,400
516	MOUNTAIN VIEW FPD	0	0	86	6,979,933	86	6,979,933
266	MOUNTAIN VILLAGE	5	324,113	0	0	5	324,113
7246	NEDERLAND FPD	0	0	5	269,285	5	269,285
7251	NORTH FORK FPD	0	0	1	64,747	1	64,747
532	NORTH METRO FIRE RESCUE	0	0	122	10,135,636	122	10,135,636
7253	NORTH ROUTH FPD	0	0	1	64,999	1	64,999
7255	NORTHEAST TELLER COUNTY FPD	0	0	13	771,263	13	771,263
175	NORTHGLENN	60	4,508,056	0	0	60	4,508,056
7259	NORTH-WEST FPD	0	0	10	484,553	10	484,553
178	NUNN	1	45,800	0	0	1	45,800
179	OAK CREEK	3	174,715	0	0	3	174,715
7263	OAK CREEK FPD	0	0	4	204,812	4	204,812
180	OLATHE	5	220,553	0	0	5	220,553
588	PAGOSA FPD	0	0	7	394,665	7	394,665
188	PAGOSA SPRINGS	6	304,045	0	0	6	304,045
189	PALISADE	9	478,013	2	126,029	11	604,042
190	PALMER LAKE	2	117,684	3	111,358	5	229,042
192	PAONIA	2	86,823	0	0	2	86,823
106	PARACHUTE	5	264,739	0	0	5	264,739
191	PARKER	73	5,923,168	0	0	73	5,923,168
7481	PLATEAU VALLEY FPD	0	0	5	314,114	5	314,114

Table 18 (continued) - Summary of Members and Adjusted Payroll by Employer

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
7285	PLATTE CANYON FPD	0	\$ 0	16	\$ 988,560	16	\$ 988,560
7287	PLATTE VALLEY FPD	0	0	18	1,183,510	18	1,183,510
196	PLATTEVILLE	9	466,427	0	0	9	466,427
513	PLATTEVILLE/GILCREST FPD	0	0	22	1,392,499	22	1,392,499
7289	PLEASANT VIEW METRO FIRE DISTRICT	0	0	7	381,454	7	381,454
518	POUDRE FIRE AUTHORITY	0	0	183	17,531,484	183	17,531,484
199	PUEBLO	190	12,976,252	125	8,622,586	315	21,598,838
519	PUEBLO RURAL FPD	0	0	28	1,405,489	28	1,405,489
7294	PUEBLO WEST METRO FPD	0	0	19	965,729	19	965,729
201	RANGELY	5	363,670	0	0	5	363,670
7298	RATTLESNAKE FPD	0	0	3	194,686	3	194,686
521	RED WHITE & BLUE FPD	0	0	51	3,892,430	51	3,892,430
206	RIFLE	18	1,171,937	0	0	18	1,171,937
7307	RIO BLANCO FPD	0	0	1	73,865	1	73,865
208	ROCKY FORD	9	306,741	5	160,483	14	467,224
752	ROCKY MOUNTAIN FPD	0	0	36	3,030,050	36	3,030,050
7314	RYE FPD	0	0	6	236,880	6	236,880
542	SABLE-ALTURA FPD	0	0	7	288,874	7	288,874
213	SALIDA	16	838,435	10	664,019	26	1,502,454
215	SANFORD	1	52,068	0	0	1	52,068
543	SECURITY FPD	0	0	32	1,323,650	32	1,323,650
220	SHERIDAN	31	2,144,772	0	0	31	2,144,772
222	SILT	6	295,980	0	0	6	295,980
228	SNOWMASS VILLAGE	10	753,184	0	0	10	753,184
524	SNOWMASS WILDCAT FPD	0	0	19	1,593,006	19	1,593,006
525	SOUTH ADAMS COUNTY FPD	0	0	54	3,315,313	54	3,315,313
5339	SOUTH FORK FPD	0	0	4	178,743	4	178,743
7339	SOUTH FORK	2	103,959	0	0	2	103,959
540	SOUTH METRO FIRE RESCUE FPD	0	0	402	35,454,839	402	35,454,839
7340	SOUTHEAST WELD FPD	0	0	18	987,650	18	987,650

Table 18 (continued) - Summary of Members and Adjusted Payroll by Employer

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
548	SOUTHERN PARK COUNTY FPD	0	\$ 0	1	\$ 32,000	1	\$ 32,000
229	SPRINGFIELD	4	155,271	0	0	4	155,271
231	STEAMBOAT SPRINGS	21	1,518,328	27	1,725,395	48	3,243,723
232	STERLING	21	1,037,502	22	979,309	43	2,016,811
7348	STRASBURG FPD #8	0	0	4	145,032	4	145,032
7349	STRATMOOR HILLS FPD	0	0	5	229,044	5	229,044
233	STRATTON	1	50,534	0	0	1	50,534
549	SUMMIT FIRE & EMS AUTHORITY	0	0	62	4,358,342	62	4,358,342
237	TELLURIDE	11	722,643	0	0	11	722,643
545	TELLURIDE FPD	0	0	8	612,049	8	612,049
238	THORNTON	236	9,591,794	122	6,151,503	358	15,743,297
7354	TIMBERLINE FPD	0	0	2	104,694	2	104,694
2557	TRI-LAKES MONUMENT FPD	0	0	44	2,751,733	44	2,751,733
240	TRINIDAD	24	1,146,682	16	840,418	40	1,987,100
595	UPPER PINE RIVER FPD	0	0	29	1,472,757	29	1,472,757
242	VAIL	30	2,434,104	29	2,187,136	59	4,621,240
7369	WELLINGTON FPD	0	0	21	1,063,435	21	1,063,435
7373	WEST DOUGLAS COUNTY FPD	0	0	1	88,884	1	88,884
534	WEST METRO FPD	0	0	349	31,280,096	349	31,280,096
7375	WEST ROUTT FPD	0	0	9	272,943	9	272,943
252	WESTMINSTER	0	0	134	10,955,679	134	10,955,679
253	WHEAT RIDGE	75	5,917,410	0	0	75	5,917,410
254	WIGGINS	2	73,422	0	0	2	73,422
7384	WINDSOR SEVERANCE FPD	0	0	45	2,680,014	45	2,680,014
259	WOODLAND PARK	21	1,120,809	0	0	21	1,120,809
260	WRAY	5	246,990	0	0	5	246,990
262	YUMA	7	344,352	0	0	7	344,352
Totals		6,249	\$ 483,827,064	5,965	\$ 463,693,366	12,214	\$ 947,520,430

Table 19 - Summary of Inactive Members

	<u>Count</u>	<u>Average Age</u>	<u>Average Monthly Benefit</u>
Totally Disabled Members*	145	58.7	\$3,226
Occupationally Disabled Members*	913	57.9	\$1,862
Beneficiaries of Deceased Active Members	127	54.1	\$1,999

* Including beneficiaries of deceased retirees

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 Aggregate Funding Method. Under this method, the contribution rate is calculated to fully fund the present value of all benefits over the remaining working career of the active employees. The contribution rate is determined as a percentage of increasing payroll.

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 (7.5%). 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 his 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 actuarial value of assets is subtracted from the present value of all expected benefits to determine the present value of future normal costs. The future normal costs are spread across the future value of salaries to be paid to the current active population to determine a contribution rate.

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.

IV. Actuarial Assumptions

The current assumptions were adopted by the Board in 2015 for first use in this valuation following a regularly scheduled experience study. The rationale for all of the current assumptions is included in that report, dated June 1, 2015.

A. Economic Assumptions

1. Investment return: 7.50% per annum, compounded annually, composed of an assumed 2.50% inflation rate and a 5.00% real rate of return. This rate represents the assumed return, net of investment expenses.
2. Salary rate: Inflation rate of 2.50%, plus productivity component of 1.50%, plus step-rate/ promotional component as shown:

Years of Service	Annual Step-rate/ Promotional Rate	Total Annual Rate of Increase Including 2.50% Inflation Component and 1.50% Productivity Component
(1)	(2)	(4)
1	10.00%	14.00%
2	8.50%	12.50%
3	8.00%	12.00%
4	7.50%	11.50%
5	2.50%	6.50%
6	1.50%	5.50%
7	1.50%	5.50%
8	1.00%	5.00%
9	0.75%	4.75%
10	0.50%	4.50%
11	0.50%	4.50%
12	0.50%	4.50%
13	0.25%	4.25%
14	0.25%	4.25%
15	0.00%	4.00%

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 the unfunded actuarial accrued liability, payroll is assumed to increase 3.50% 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. Mortality rates (members in payment status) –

a. Healthy retirees and beneficiaries: For ages less than 55, RP-2014 Mortality Tables for Blue Collar Employees. For ages 65 and older, RP-2014 Mortality Tables for Blue Collar Healthy Annuitants. For ages 55 through 64, a blend of the previous tables. All tables are projected with Scale BB.

Annual Rate per 1,000 Members					
Attained Age in 2018	Males	Females	Attained Age in 2018 (cont.)	Males	Females
(1)	(2)	(3)	(4)	(5)	(6)
50	2.16	1.22	70	18.53	13.31
55	3.65	1.95	75	29.66	21.89
60	7.13	4.53	80	48.82	36.36
65	12.02	8.31	85	81.74	61.95

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

Gender	Year of Retirement			
	2016	2021	2026	2031
Male	30.2	30.7	31.3	31.9
Female	32.8	33.3	33.7	34.2

b. Occupationally disabled retirees: Healthy retiree tables set forward three years.

Annual Rate per 1,000 Members					
Attained Age in 2018	Males	Females	Attained Age in 2018 (cont.)	Males	Females
(1)	(2)	(3)	(4)	(5)	(6)
50	2.93	1.58	70	24.48	17.92
55	5.51	3.28	75	39.88	29.61
60	9.97	6.73	80	66.42	49.93
65	15.47	10.97	85	112.69	85.79

c. Totally disabled retirees: RP-2014 Disabled Mortality Tables, projected with Scale BB, with minimum probability of 3% for males and 2% for females.

Annual Rate per 1,000 Members					
Attained Age in 2018	Males	Females	Attained Age in 2018 (cont.)	Males	Females
(1)	(2)	(3)	(4)	(5)	(6)
50	30.00	20.00	70	37.98	26.87
55	30.00	20.00	75	51.10	39.11
60	30.00	20.00	80	72.12	58.16
65	30.19	20.00	85	106.66	86.16

2. Mortality rates (active members) – RP-2014 Mortality Tables for Blue Collar Employees, projected with Scale BB, 55% multiplier for off-duty mortality. Increased by 0.00020 for on-duty related Fire and Police experience. Sample rates are shown below:

Annual Rate per 1,000 Members					
Attained Age in 2018	Males	Females	Attained Age in 2018 (cont.)	Males	Females
(1)	(2)	(3)	(4)	(5)	(6)
20	0.49	0.30	40	0.64	0.44
25	0.54	0.31	45	0.88	0.60
30	0.52	0.33	50	1.39	0.87
35	0.57	0.37	55	2.16	1.21

3. Disability rates: Sample rates are shown below.

Annual Rate per 1,000 Members				
Age	Occupational Disability Rates (MP)	Occupational Disability Rates (SWDB)	Total Disability Rates (MP)	Total Disability Rates (SWDB)
(1)	(2)	(3)	(4)	(5)
25	0.25	0.29	0.01	0.02
30	1.18	1.35	0.11	0.17
35	1.60	1.82	0.23	0.34
40	2.35	2.67	0.35	0.52
45	4.09	3.29	0.48	0.72
50	8.86	4.89	0.63	0.94
55	15.53	6.88	0.78	1.17

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	98.5	8	25.5	16	9.4
1	84.6	9	21.3	17	9.1
2	72.3	10	17.9	18	8.8
3	61.4	11	15.3	19	8.5
4	51.9	12	13.3	20	8.1
5	43.6	13	11.7	21	7.5
6	36.5	14	10.7	22	6.5
7	30.5	15	9.9	23	5.2

5. Retirement rates: Members are assumed to retire at the time of attaining:
- a. Statewide Death & Disability Plan Members and other New Hire Plan Members: Age 55 with 5 years of service or current age, if greater.
 - b. Money Purchase Plan Members: The earliest of Age 65 or 55 and 25 years of service; or current age, if greater. For members age 55 with less than 25 years of service, graded retirement rates from 7% at age 55 to 16% at age 64, increasing by 1% per year.
 - c. All Other Plan members: Age 52 or current age, if greater.

C. Other Assumptions

1. Family status: 85% of employees are assumed to be married or in a civil union. Those assumed to be married or in a civil union are assumed to have two or more dependent children until age 51.
2. 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.
3. Post-retirement benefit adjustments: Totally disabled 3.0%; All others 0.0%.
4. Percent electing annuity on death (when eligible): All of the spouses of vested, married participants are assumed to elect an annuity.
5. There will be no recoveries once disabled.
6. No surviving spouse will remarry.
7. Earned income: It is assumed that there are no offsets for Worker's Compensation or other current income.
8. Dependent children: Dependency status assumed to terminate at age 21.
9. Combined spouse/dependent records: In cases, where an annuitant record includes benefits for both a spouse and a dependent child, the total benefit was assumed to be payable for the life of the spouse.
10. Administrative expenses: Based on actual administrative expenses paid in the prior year, adjusted by wage inflation.
11. Money Purchase Offset: For members where no data is available, the current money purchase balance is estimated using current pay, estimated pay histories, actual plan investment returns, and the current money purchase contribution rate specific by employer. The balance is projected forward using 7.50% investment returns, and the current money purchase contribution rate specific by employer. The money purchase account used for offset is limited based on the specific money purchase contribution rate by employer and the contribution rate requirements for the Statewide Death & Disability Plan. At decrement, the limited account is converted to an annuity using current actuarial equivalence factors.
12. SRA Offset: The SRA balances are projected forward using 7.50% investment returns. For reentry members, the assumed annual contribution to the account is 4% less the surcharge determined as of the prior valuation. At decrement, the account is converted to an annuity using current actuarial equivalence factors.
13. Decrement timing: Decrements of all types are assumed to occur mid-year.

14. 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.
15. Decrement relativity: Decrement rates are used directly from the experience study, without adjustment for multiple decrement table effects.
16. 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.

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 an 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 following:

- If the YTD service credit is at least 12, then use the earnings for the year preceding the valuation date
- If the YTD service credit is less than 12, then use the greater of the earnings for the year preceding the valuation date or the annual salary.
- If the YTD service credit is less than 12, greater than 0 and the Member DD Flag is N, then use the annualized earnings for the year preceding the valuation date.
- If both Salary YTD and Annual Salary are zero, an array of salaries based on service will be used to estimate the salary.
- Finally, the prior salaries are used to prevent the valuation salary from decreasing.

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

E. Changes to the assumptions:

There were no changes to assumptions since the prior valuation.

SUMMARY OF BENEFIT PROVISIONS

Plan Description

The Fire & Police Pension Association Statewide Death & Disability Plan (“Plan”) is a cost-sharing multiple-employer defined benefit death and disability plan covering full-time employees of substantially all fire and police departments in Colorado. As of August 5, 2003, the Plan may include part-time police and fire employees. Contributions to the Plan are used for the payment of death and disability benefits. Employers who are covered by Social Security may elect supplementary coverage by the Plan. The Plan was established in 1980 pursuant to Colorado Revised Statutes. The Plan assets are included in the Fire & Police Members’ Benefit Investment Fund.

Plan benefits provide 24-hour coverage, both on and off duty and are available for members not eligible for normal retirement under a defined benefit plan, or members who have not met 25 years of accumulated service and age 55 under a money purchase plan.

In the case of an on-duty death, benefits may be payable to the surviving spouse and/or dependent children of active members who were eligible to retire, but were still working. Death and disability benefits are free from state and federal taxes in the event that a member’s disability is determined to be the result of an on-duty injury or an occupational disease.

Plan Year

A twelve-month period ending December 31.

Members Included

Members included are active employees who are full-time salaried employees of a participating municipality or fire protection 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 include part-time police and fire employees. A department chief who elects to be exempted from the Fire & Police Pension Association Defined Benefit System and covered under Social Security or Colorado Public Employees Retirement Association shall not be covered by the Plan.

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, except that personnel whose position does not require passage of a fitness for duty test shall not be eligible for participation in the Statewide Death & Disability Plan.

Compensation Considered (Base Salary)

Base salary means the total base rate of pay including Member Contributions to the Statewide Defined Benefit Plan or Statewide Money Purchase Plan (or contributions to any alternate retirement 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 their 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 (a Member is deemed temporarily acting in a higher rank if the appointment to the rank is anticipated to last less than six months), uniform allowances, accumulated sick leave pay, accumulated vacation leave pay (except as noted in the preceding sentence), and other forms of extra pay (including Member Contributions which are paid by the employer and not deducted from the Member's salary).
- 6) The base salary under the Plan for each Member of the Colorado Springs New Hire Pension Plan shall be the same as the basic salary as defined in the Colorado Springs New Hire Pension Plan.

Contribution Rates

Prior to 1997, the Plan was primarily funded by the State of Colorado, whose contributions were established by Colorado statute. In 1997 the State made a one-time contribution of \$39,000,000 to fund past and future service costs for all firefighters and police officers hired prior to January 1, 1997. No further State contributions are anticipated.

Members hired on or after January 1, 1997 and members covered by Social Security, began contributing 2.4 percent of base salary to this Plan as of January 1, 1997. The contribution increased to 2.6 percent of base salary as of January 1, 2007. The contribution rate increased to 2.7 percent of base salary as of January 1, 2017. This percentage can vary depending on actuarial experience. All contributions are made by members or on behalf of members. The contribution may be paid entirely by the employer or member, or it may be split between the employer and the member.

Pre-Retirement Death Benefits

If a member dies prior to normal retirement eligibility while off-duty, the surviving spouse shall receive a benefit equal to 40 percent of the monthly base salary paid to the member prior to death. An additional 10 percent of base salary is payable if a surviving spouse has two or more dependent children. If there is no surviving spouse, but the member had one or two dependent children, the benefit payable is 40 percent of the member's monthly base salary. If there is no spouse but three or more dependent children, the benefit equals 50 percent of the member's monthly base salary.

As of October 15, 2002, if a member dies prior to retirement while on-duty; the surviving spouse shall receive a benefit equal to 70 percent of the member's monthly base salary regardless of the number of dependent children. If there is no spouse but one or more dependent children living in the member's household the benefit equals 70 percent of the member's monthly base salary. If there are dependent children without a surviving spouse, and they do not live in the household, the benefit is 40 percent for the first child and 15 percent for each additional child, but not greater than 70 percent in total of the member's monthly base salary. Benefits will be paid to the spouse until death and to dependent children until age 23, death, marriage or other termination of dependency. Benefits may be extended for an incapacitated child.

For purposes of this Plan, a spouse includes a partner in a civil union. These benefits are offset by Money Purchase account balances, Stabilization Reserve Accounts ("SRA") and Deferred Retirement Option Plan ("DROP") accounts, converted to annuities.

Disability Benefits

The Plan provides the members with two types of disability: occupational and total.

Occupational Disability means a member is unable to perform their assigned duties due to a medical condition that is expected to last at least 1 year. Assigned duties are those specific tasks or job duties that a member is required to regularly perform. Within the Occupational Disability category, there are two sub-categories: Temporary Occupational Disability and Permanent Occupational Disability.

Temporary Occupational Disability is an occupational disability for which there is prognosis for improvement or recovery through surgical treatment, counseling, medication, therapy or other means.

Permanent Occupational Disability is an occupational disability caused by a condition that is permanent or degenerative and for which there is no prognosis for improvement or recovery through surgical treatment, counseling, medication, therapy or other means.

Total Disability means the member is unable to engage in any substantial gainful activity due to a medically determined physical or mental impairment that may be expected to result in death or that has lasted or is expected to last at least 1 year.

A member who becomes disabled prior to normal retirement eligibility shall be eligible for disability benefits.

If the member is totally disabled, the member shall receive 70 percent of their base salary preceding disability.

If the member is occupationally disabled and their disability is determined to be a permanent occupational disability, the member shall receive 50 percent of their base salary preceding disability regardless of their family status. If the member is occupationally disabled and the disability is determined to be a temporary occupational disability, the member shall receive 40 percent of their base salary preceding disability regardless of their family status for up to five years.

Total disability and permanent occupational disability benefits are offset by the Money Purchase, DROP or SRA balances, converted to annuities. For member's who also participate in Social Security, disability benefits are reduced by Social Security disability benefits derived from employment as a member, if applicable.

Temporary Occupational Disability benefits are payable for a maximum of five years. Permanent Occupational and Total Disability benefits are payable as long as the member remains disabled.

Offsets for SRA, Money Purchase Balances, and DROP

Plan benefits are reduced by the actuarially equivalent annuities of the SRA, Money Purchase, and DROP account balances. A maximum of 16 percent (or 20 percent for reentry members) of the annual Money Purchase contributions apply for this purpose. Benefits provided by the Plan are also offset by any defined benefit that the member may have received due to work as a Colorado firefighter or police officer.

Spousal income, IRAs, insurance benefits, legal awards, and other investment incomes are not subject to any offset. Deferred compensation accounts are generally not subject to an offset. However, if a department chief has contributions directed to a deferred compensation plan in lieu of a pension plan, the benefit award is offset based on the amount in the deferred compensation account. The amount of the offset is calculated in the same manner as the money purchase offset.

Actuarial equivalence is based on tables adopted by the Fire & Police Pension Association Board of Directors.

Optional Forms of Payment

The Plan provides four choices for receipt of the Permanent Occupational and Total Disability benefits.

Normal Option – The disabled retiree receives an unreduced benefit, payable for as long as the disability exists and as long as the member remains eligible. Upon the death of the retiree, the benefit is discontinued.

Option 1 (Joint and 100% Survivor) - The disabled retiree's benefit amount is reduced on an actuarially equivalent basis, payable for as long as the disability exists and as long as the member remains eligible. Upon the death of the retiree, the designated beneficiary receives 100 percent of the retiree's actuarially equivalent reduced benefit for life.

Option 2 (Joint and 50% Survivor) - The disabled retiree's benefit amount is reduced on an actuarially equivalent basis, payable for as long as the disability exists and as long as the member remains eligible. Upon the death of the retiree, the designated beneficiary receives 50 percent of the retiree's actuarially equivalent reduced benefit for life.

Option 3 (Family Benefit) - The disabled retiree's benefit amount is reduced on an actuarially equivalent basis, payable for as long as the disability exists and as long as the member remains eligible. Upon the death of the retiree, the actuarially equivalent reduced benefit amount is paid to the surviving spouse* and dependent children, if any, until the death of the surviving spouse, the death of any incapacitated child, or until the youngest child reaches age 23, whichever is later.

*Per FPPA Rule 402.10(c) 'Spouse' for the purposes of Payment Option 3 means the Member's spouse at the time the first benefit payment is negotiated. If the spouse beneficiary is removed by the Member or dies, the Member is not permitted to add a subsequent spouse.

Actuarial equivalence is based on tables adopted by the Fire & Police Pension Association Board of Directors.

Benefit Adjustments for Benefits in Pay Status

A benefit adjustment of up to 3 percent may be granted to members and survivors by the Fire & Police Pension Association Board of Directors annually. Totally disabled members and their beneficiaries receive an automatic benefit adjustment each year of 3 percent. The benefit adjustment is effective October 1st. A benefit adjustment may begin after receiving benefits for at least 12 calendar months prior to October 1.