

FIRE AND POLICE PENSION ASSOCIATION
STATEWIDE DEATH AND DISABILITY FUND
ACTUARIAL VALUATION REPORT
FOR THE YEAR BEGINNING JANUARY 1, 2017

June 30, 2017

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

**Re: Actuarial Valuation of the FPPA Death & Disability Fund (the Plan) as of
January 1, 2017**

Dear Members of the Board:

We are pleased to present our Report on the actuarial valuation of the Statewide Death & Disability Fund for the Fire and Police Pension Association (FPPA) as of January 1, 2017.

We certify that the information included herein and contained in our 2017 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the FPPA Death & Disability Fund as of January 1, 2017.

Our Report presents the results of the January 1, 2017 actuarial valuation of the FPPA Statewide Death & Disability Fund (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. In addition, the report provides information required in connection with Governmental Accounting Standards Board Statement No. 43, Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans, (GASB 43) and No. 45, Accounting and Financial Reporting by Employers for Post-Employment Benefits Other Than Pensions, (GASB 45), and it provides various summaries of the data.

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, 2017, the Plan has a surplus of \$17 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 2.48%, therefore, the current 2.70% contribution rate is adequate to provide some 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, 2017. 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. These assumptions are also in full compliance with all of the parameters established by GASB No. 43 and No. 45.

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, 2017. 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, 2017.

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 2017 are based on the same assumptions, methods and provisions used for the January 1, 2017 valuation.

5-Year Deterministic Projection						
January 1,	Market Value Investment Return					
	3.50%		7.50%		11.50%	
	FR	ARC	FR	ARC	FR	ARC
2017	104.8%	2.48%	104.8%	2.48%	104.8%	2.48%
2018	103.2%	2.56%	104.0%	2.53%	105.1%	2.48%
2019	100.9%	2.66%	103.2%	2.56%	106.1%	2.43%
2020	98.1%	2.79%	102.4%	2.59%	108.0%	2.35%
2021	95.1%	2.92%	102.3%	2.60%	110.6%	2.22%
2022	91.8%	3.07%	102.6%	2.58%	114.1%	2.06%

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



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



Dana Woolfrey, FSA, EA, MAAA
Consultant and Actuary



Linna Ye, ASA, MAAA
Actuary

klb

K:\2626\2017\SWDD\VAL\2017 DD Valuation Report.DOC

	<u>PAGE</u>
Section I	Executive Summary..... 2
Section II	Discussion 5
Section III	Tables
	1 – Development of Unfunded Actuarial Accrued Liability..... 14
	2 – Actuarial Present Value of Future Benefits 15
	3 – Actuarial Gain/(Loss) on UAAL 16
	4 – Summary of Historical Valuation Results 17
	5 – Allocation of Plan Assets at Fair Value..... 18
	6 – Reconciliation of Plan Net Assets..... 19
	7 – Development of Actuarial Value of Assets 20
	8 – Investment Yields 21
	9 – Gain/(Loss) on Actuarial Value of Assets 22
	10 – History of Investment Return Rates..... 23
	11 – Schedule of Funding Progress (As required by GASB #43) 24
	12 – History of Employer Contributions 26
	13 – Solvency Test 27
	14 – Cash Flow Analysis..... 28
	15 – Annual Required Contribution..... 29
	16 – Notes to Required Supplementary Information (As required by GASB #43)..... 30
	17 – Membership Data 31
	18 – Historical Summary of Active Member Data..... 32
	19 – Distribution of Active Members by Age and by Years of Service as of December 31, 2016..... 33
	20 – Schedule of Retirants & Annuitants Added to & Removed from Rolls 34
	21 – Summary of Members and Adjusted Payroll by Employer 35
	22 – Summary of Inactive Members..... 44
Section IV	Appendix A – Summary of Actuarial Methods and Assumptions 46
	Appendix B – Summary of Benefit Provisions 55
Section V	Supplemental Studies 60

SECTION I

EXECUTIVE SUMMARY

Executive Summary

Item	January 1, 2017	January 1, 2016
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 	11,975 139 852 120 13,086 \$ 917,100	11,681 135 809 119 12,744 \$ 863,106
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 	\$ 360,747 374,944 5.2% 6.3% \$ 18,216 103.9%	\$ 351,520 361,070 1.4% 6.8% \$ 16,938 102.7%
Actuarial Information <ul style="list-style-type: none"> • Unfunded actuarial accrued liability/(surplus) • GASB funded ratio 	\$ (17,028) 104.8%	\$ (16,288) 104.7%

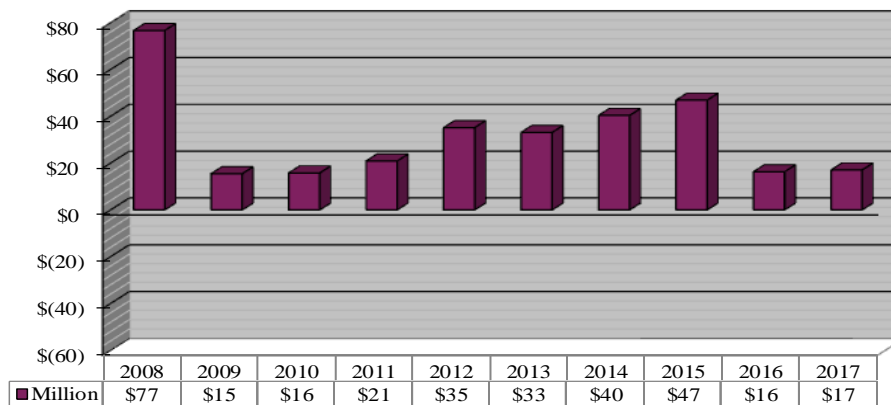
Note: Dollar amounts in \$000

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, 2017.
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 12,744 in 2016 to 13,086 in 2017, an increase of 2.7%.
4. Current plan benefits provide an automatic 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 0.29% permanent annual benefit adjustment.
5. The plan assets at the valuation date are in excess of the net present value of benefits by \$17 million. This surplus position compares to the \$16 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 5.2% on a market basis and 6.3% on an actuarial basis in 2016, producing an actuarial loss of \$4.1 million.
7. The funded ratio increased from 104.7% to 104.8% as of January 1, 2017.

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

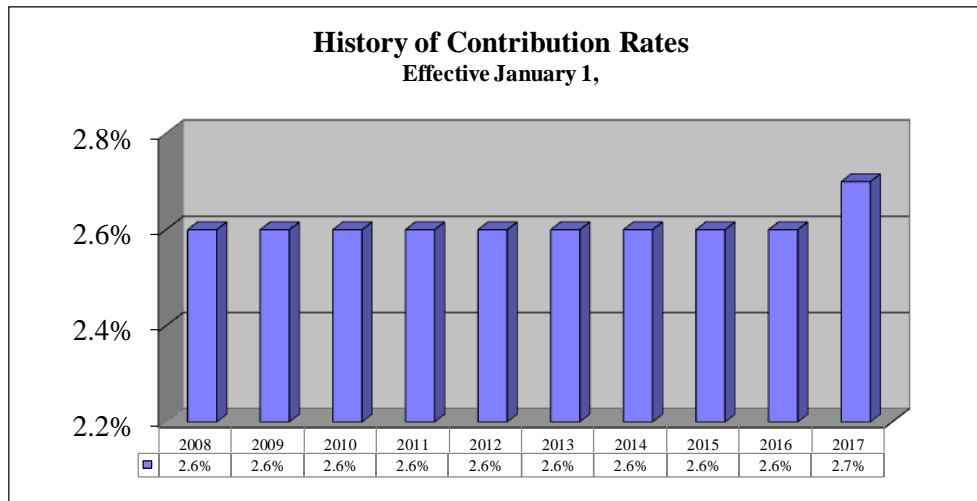


SECTION II
DISCUSSION

Contribution Requirements

The valuation of the Fire and Police Pension Association Statewide Death & Disability Fund (D&D) as of January 1, 2017, 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 2.48% (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 0.29% permanent annual benefit adjustment. The cost of a one-year 0.29% benefit adjustment for current annuitants (excluding totally disabled) is \$0.7 million. The \$0.7 million 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.

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, 2017. The market value of assets reported was \$360.7 million as of January 1, 2017, as compared to \$351.5 million as of January 1, 2016. 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.

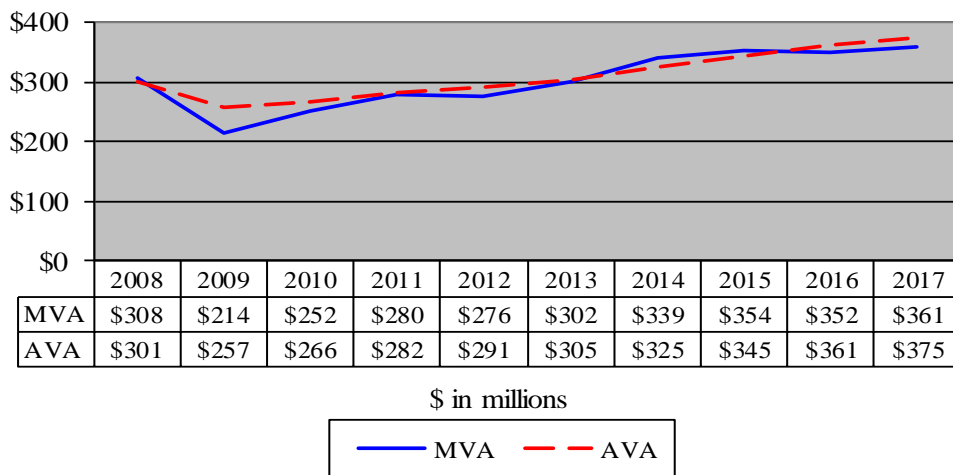
The asset valuation method uses a five-year phase in of the excess (shortfall) between expected investment return and actual income. Expected earnings used to project the actuarial value are determined using the assumed investment return rate and the beginning of year actuarial value of assets (adjusted 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 \$361.1 million to \$374.9 million since the prior valuation. This increase was less than expected and produced a loss of approximately \$4.1 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 5.17% in 2016; lower than the assumed 7.5% return. The actuarial asset value returned 6.34%, compared to 6.80% in 2015. 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 (56 actual vs. 45.2 expected) and less active member deaths than expected (4 actual vs. 8.0 expected). The plan had more annuitant deaths than expected (18 actual vs. 13.5 expected). The combination of these experiences created a small overall liability loss.

Member Data

FPPA supplied member data as of January 1, 2017. 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.

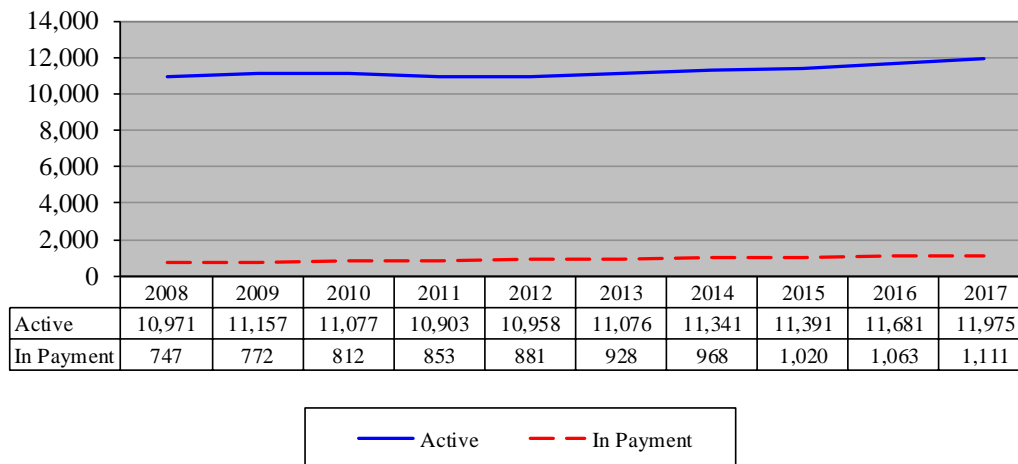
For local Money Purchase members, an array based on service was used to estimate each member’s Money Purchase balance. For missing salary in the data, an array of salaries based on service was used to estimate the salary.

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:
 - 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.
 - On-duty: 70% of the base salary paid to the member prior to death.
- Disability Benefits:
 - Total Disability: 70% of the base salary preceding disability.
 - Permanent Occupational Disability: 50% of the base salary preceding disability.
 - 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.

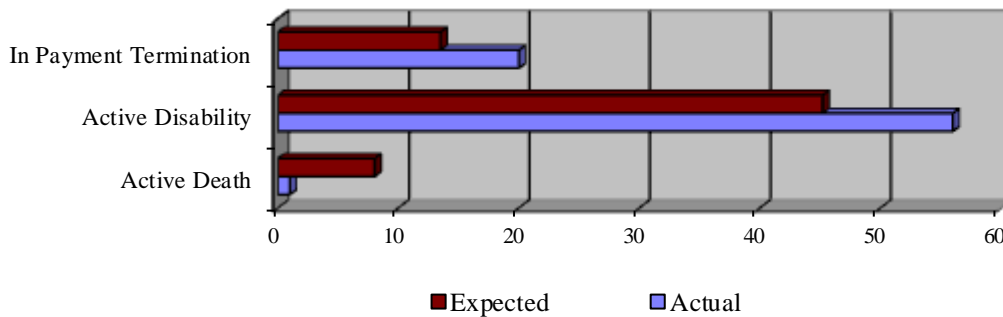
The actuarial value of future benefits from the Plan is based on several economic and non-economic assumptions. These are summarized in Appendix A as well. The economic assumptions include investment return and salary increases. Non-economic assumptions include rates of mortality, disability, and separation.

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 FY2016, the actual salary increases were 100.6% of expected. The following charts provide a comparison of the actual experience versus the expected experience for selected assumptions.

Demographic Experience - FY2016



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

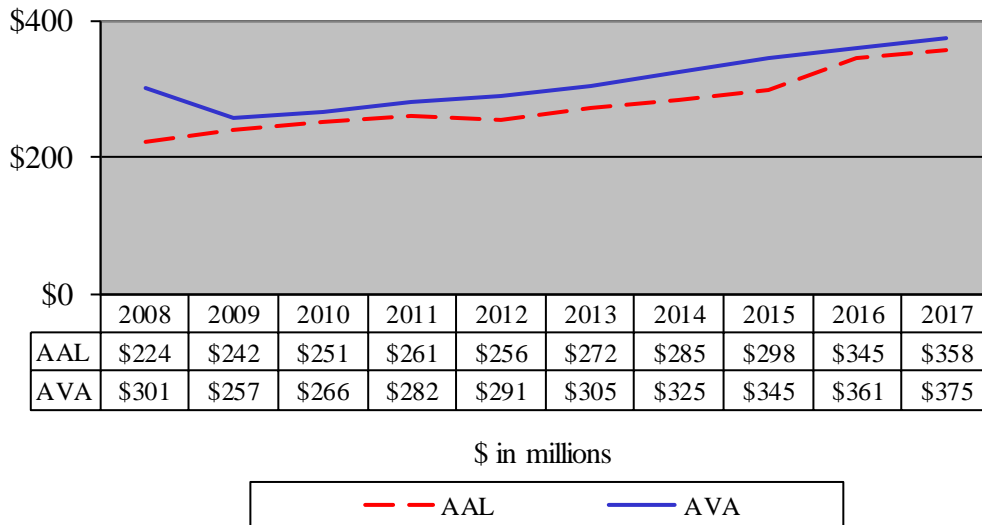
GASB 43, GASB 45, and Funding Progress

Accounting requirements for FPPA are set by Governmental Accounting Standards Board Statement No. 43, *Financial Reporting for Postemployment Benefit Plans Other Than Pension Plans* (GASB 43) and No. 45, *Accounting and Financial Reporting by Employers for Postemployment Benefits Other Than Pension* (GASB 45). 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. Table 16 shows other information needed in connection with disclosure under GASB 43. GASB Statement No. 45 governs reporting by the employers of government-sponsored retirement plans. Table 15 shows the development of the net Other Postemployment Benefits (OPEB) obligation.

For FPPA, the employer Annual Required Contribution for 2016 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 2016 and demographic experiences created actuarial losses for the Plan. Outstanding deferred investment losses will put downward pressure on the funded ratio in future valuations if not offset by future gains.

Risk Metrics

The Statewide Death and Disability Plan provides death and disability benefits to members covered under the Statewide Defined Benefit 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%
2007	86%	61%	2.20%	0.69%	141.2%	-14.1%
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%

Market Value Results

Investment losses are smoothed over five years, and currently, the smoothed or actuarial value of assets is 103.94% of the market value. If the Funded Ratio and Calculated Contribution had been measured using the Market Value of Assets, they would be 100.8% and 2.66% of payroll, respectively.

SECTION III

TABLES

Development of Unfunded Actuarial Accrued Liability

	January 1, 2017	January 1, 2016
1. Covered payroll for upcoming year	\$ 942,821,891	\$ 886,801,928
2. Present value of future pay		
a. Total	\$ 8,297,042,458	\$ 7,785,913,663
b. Contributory (Hired on or after January 1, 1997)	7,700,418,526	7,086,195,947
3. Present value of benefits for active members		
a. Future occupational disabilities	\$ 161,766,374	\$ 152,345,427
b. Future total disabilities	41,339,576	38,905,158
c. Future active deaths	35,871,645	33,761,290
d. Total for actives	<u>\$ 238,977,595</u>	<u>\$ 225,011,875</u>
4. Total present value of benefits		
a. Current disabled members	\$ 287,455,996	\$ 265,786,156
b. Current beneficiaries of deceased members	30,923,169	30,430,242
c. Active members (Item 3d)	<u>238,977,595</u>	<u>225,011,875</u>
d. Total	<u>\$ 557,356,760</u>	<u>\$ 521,228,273</u>
5. Unfunded actuarial accrued liability (UAAL)/(surplus)		
a. Present value of benefits	\$ 557,356,760	\$ 521,228,273
b. Present value of administrative costs*	8,470,460	7,794,816
c. Less present value of future contributions (2.7%/2.6%)	(207,911,300)	(184,241,095)
d. Less actuarial value of assets	<u>(374,943,903)</u>	<u>(361,070,410)</u>
e. UAAL/(surplus)	\$ (17,027,983)	\$ (16,288,416)
6. a. Current Contribution	2.70%	2.60%
b. Calculated Contribution (Aggregate Funding) [(5.a + 5.b + 5.d)/2.b]	<u>2.48%</u>	<u>2.37%</u>
c. Difference (a. - b.)	0.22%	0.23%

*As of January 1, 2016, this is a method change to explicitly include administrative expenses.

Actuarial Present Value of Future Benefits

	<u>January 1, 2017</u>	<u>January 1, 2016</u>
1. Active members		
a. Total disability	\$ 41,339,576	\$ 38,905,158
b. Occupational disability	161,766,374	152,345,427
c. Off-duty death	24,720,907	23,336,774
d. On-duty death	11,150,738	10,424,516
e. Total	<u>\$ 238,977,595</u>	<u>\$ 225,011,875</u>
2. Members in pay status		
a. Total disabled	\$ 75,194,539	\$ 69,648,686
b. Occupationally disabled	212,261,457	196,137,470
c. Survivors	30,923,169	30,430,242
d. Total	<u>\$ 318,379,165</u>	<u>\$ 296,216,398</u>
3. Total actuarial present value of future benefits	\$ 557,356,760	\$ 521,228,273

Actuarial Gain/(Loss) on UAAL

For the year ending December 31,	2016	2015
1. Unfunded actuarial accrued liability (UAAL) as of January 1	\$ (16,288,416)	\$ (46,880,478)
2. Interest on UAAL for one year	(1,221,631)	(3,516,036)
3. Expected UAAL as of December 31 (1 + 2)	(17,510,047)	(50,396,514)
4. Change in Unfunded Liability due to:		
a. Benefit Changes	(7,724,602)	0
b. Provision or Assumption Changes	0	31,734,610
5. Expected UAAL as of December 31 after changes in assumption, methods and plan provisions	(25,234,649)	(18,661,904)
6. Actual UAAL as of December 31	(17,027,983)	(16,288,416)
7. Actuarial gain/(loss) for the period (5 - 6)	(8,206,666)	(2,373,488)
 <u>SOURCE OF GAINS/(LOSSES)</u>		
8. Asset gain/(loss) (See Table 9)	(4,146,064)	(2,387,649)
9. Salary liability gain/(loss) for the period	(449,697)	804,572
10. Benefit adjustment granted as of October 1 (0.30% in 2016, 0.96% in 2015)	(679,703)	(1,983,614)
11. Net liability gain/(loss) for the period (7- 8 - 9 - 10)	(2,931,202)	1,193,202

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%.

**Summary of Historical Valuation Results
 As of the Valuation Date January 1,**

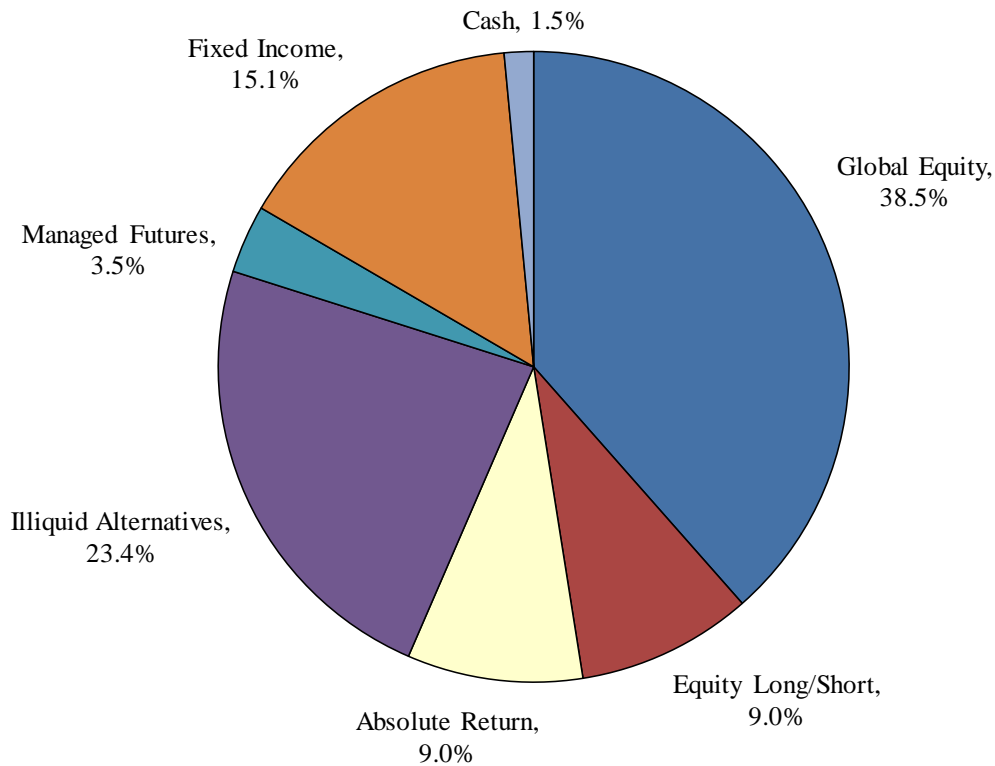
	<u>2017</u>	<u>2016</u>	<u>2015</u>	<u>2014</u>	<u>2013</u>	<u>2012</u>	<u>2011</u>	<u>2010</u>	<u>2009</u>	<u>2008</u>
1. Number of members										
a. Active	11,975	11,681	11,391	11,341	11,076	10,958	10,903	11,077	11,157	10,971
b. Disabled	991	944	904	851	814	774	747	706	673	647
c. Survivor	120	119	116	117	114	107	106	106	99	100
d. Total	<u>13,086</u>	<u>12,744</u>	<u>12,411</u>	<u>12,309</u>	<u>12,004</u>	<u>11,839</u>	<u>11,756</u>	<u>11,889</u>	<u>11,929</u>	<u>11,718</u>
2. Covered payroll (prior year)	\$ 917,100	\$ 863,106	\$ 827,633	\$ 810,578	\$ 787,010	\$ 755,952	\$ 750,497	\$ 751,781	\$ 729,724	\$ 668,502
3. Average compensation	\$ 76,585	\$ 73,890	\$ 72,657	\$ 71,473	\$ 71,055	\$ 68,986	\$ 68,834	\$ 67,869	\$ 65,405	\$ 60,934
4. Covered payroll for upcoming year	\$ 942,822	\$ 886,802	\$ 844,536	\$ 834,268	\$ 833,177	\$ 801,017	\$ 802,802	\$ 806,605	\$ 785,321	\$ 719,402
5. Actuarial value of assets	\$ 374,944	\$ 361,070	\$ 345,009	\$ 325,181	\$ 305,455	\$ 290,988	\$ 281,577	\$ 266,478	\$ 257,279	\$ 300,643
6. Market value of assets	\$ 360,747	\$ 351,520	\$ 353,776	\$ 339,347	\$ 301,653	\$ 275,873	\$ 279,882	\$ 251,923	\$ 214,400	\$ 308,170
7. Present value of benefits										
a. Actives	\$ 238,978	\$ 225,012	\$ 201,711	\$ 203,254	\$ 198,232	\$ 192,101	\$ 214,708	\$ 218,346	\$ 217,161	\$ 192,594
b. Disabled	287,456	265,786	243,179	221,357	204,847	189,203	169,063	155,625	144,846	134,985
c. Survivors	30,923	30,430	25,703	26,290	25,700	23,036	22,180	22,413	20,894	19,629
d. Total	<u>\$ 557,357</u>	<u>\$ 521,228</u>	<u>\$ 470,593</u>	<u>\$ 450,900</u>	<u>\$ 428,778</u>	<u>\$ 404,340</u>	<u>\$ 405,952</u>	<u>\$ 396,385</u>	<u>\$ 382,901</u>	<u>\$ 347,208</u>
8. Calculated Contribution	2.48%	2.37%	1.89%	1.97%	2.05%	1.98%	2.23%	2.32%	2.31%	0.98%

\$ amounts in '000s

**Allocation of Plan Assets
 at Fair Value**

	<u>Actual Allocation</u> January 1, 2017	<u>Target</u> <u>Allocation</u>
1. Global Equity	38.5%	36.0%
2. Equity Long/Short	9.0%	10.0%
3. Absolute Return	9.0%	10.0%
4. Illiquid Alternatives	23.4%	23.0%
5. Managed Futures	3.5%	4.0%
6. Fixed Income	15.1%	15.0%
7. Cash	<u>1.5%</u>	<u>2.0%</u>
	100.0%	100.0%

Asset Allocation as of January 1, 2017



Reconciliation of Plan Net Assets

	Year Ending	
	December 31, 2016	December 31, 2015
1. Market value of assets at January 1	\$ 351,519,816	\$ 353,776,233
2. Revenue for the year		
a. Contributions		
i. Member contributions	\$ 3,170,693	\$ 2,980,748
ii. Employer contributions *	15,045,423	13,957,159
iii. Contributions from the SWDD Plan	0	0
b. Net investment income		
i. Interest	\$ 972,037	\$ 872,152
ii. Dividends	2,726,640	3,018,614
iii. Net change in accrued income	(16,302)	77,784
iv. Unrealized gain/(loss)	8,671,163	(8,846,261)
v. Realized gain/(loss)	7,842,888	11,175,986
vi. Investment expense	(3,693,993)	(3,540,154)
vii. Other Income	1,458,275	2,850,975
c. Total revenue	\$ 36,176,824	\$ 22,547,003
3. Expenditures for the year		
a. Benefit payments and refunds	\$ (26,187,814)	\$ (24,096,515)
b. Administrative expense	(761,530)	(706,904)
c. Total expenditures	\$ (26,949,344)	\$ (24,803,419)
4. Increase in net assets (Item 2c + Item 3c)	\$ 9,227,480	\$ (2,256,417)
5. Market value of assets at December 31 (Item 1 + Item 4)	\$ 360,747,296	\$ 351,519,816

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

Development of Actuarial Value of Assets

For the year ending December 31,

2016

1. Actuarial value of assets at beginning of year	\$ 361,070,410
2. Net new investments	
a. Contributions	\$ 18,216,116
b. Benefits paid	(26,187,814)
c. Administrative expense	(761,530)
d. Net cash flow	<u>(8,733,228)</u>
3. Assumed investment return rate for fiscal year	7.5%
4. Assumed investment return for fiscal year	\$ 26,752,785
5. Expected Actuarial Value at end of year	\$ 379,089,967
6. Market value of assets at end of year	\$ 360,747,296
7. Excess return (6-5)	\$ (18,342,671)
8. Development of amounts to be recognized as of December 31, 2016:	

Fiscal Year End	Remaining Deferrals of Excess (Shortfall) of Investment Income (1)	Offsetting of Gains/(Losses) (2)	Net Deferrals Remaining (3) = (1) + (2)	Years Remaining (4)	Recognized for this valuation (5) = (3) / (4)	Remaining after this valuation (6) = (3) - (5)
2012	\$ 0	\$ 0	\$ 0	1	\$ 0	\$ 0
2013	0	0	0	2	0	0
2014	0	0	0	3	0	0
2015	(9,550,594)	0	(9,550,594)	4	(2,387,649)	(7,162,945)
2016	<u>(8,792,077)</u>	<u>0</u>	<u>(8,792,077)</u>	5	<u>(1,758,415)</u>	<u>(7,033,662)</u>
Total	\$ (18,342,671)	\$ 0	\$ (18,342,671)		\$ (4,146,064)	\$ (14,196,607)

9. Actuarial value of assets as of December 31, 2016 (Item 6 - Item 8)	\$ 374,943,903
10. Ratio of actuarial value to market value	103.9%

Amounts in column (1) for fiscal years ending 2012 through 2015 are from the prior valuation. The column (1) amount for fiscal year 2016 is developed using item 7 less the total of column (1) for fiscal years ending 2012 through 2015. To the extent possible, the 2016 excess or shortfall is used to reduce prior bases. In this case, both the 2016 base and prior bases were shortfall bases and no offsetting occurred. The fiscal year 2012 through 2014 bases are \$0 because they were previously offset.

Investment Yields

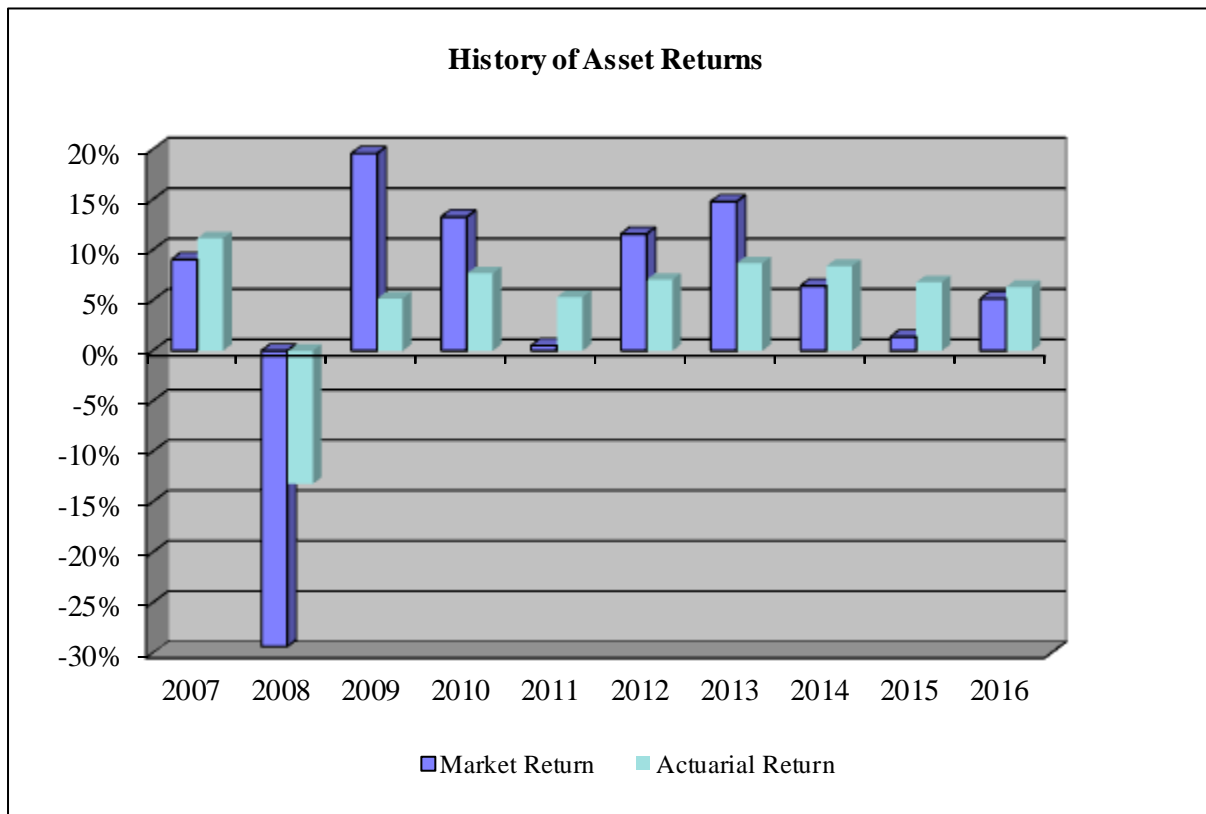
Item	Market Value	Actuarial Value
1. Assets as of January 1, 2016 (A)	\$ 351,519,816	\$ 361,070,410
2. Contributions during FY16	18,216,116	18,216,116
3. Benefit payments and admin expenses during FY16	(26,949,344)	(26,949,344)
4. Investment return during FY16	17,960,708	22,606,721
5. Assets as of January 1, 2017 (B): (1 + 2 - 3 + 4)	360,747,296	374,943,903
6. Approximate rate of return on average invested assets		
a. Net investment income (I)	17,960,708	22,606,721
b. Estimated return based on $(2I / (A + B - I))$	5.17%	6.34%

Gain/(Loss) on Actuarial Value of Assets

Item	Valuation as of January 1, 2017	Valuation as of January 1, 2016
1. Actuarial assets, prior valuation	\$ 361,070,410	\$ 345,009,408
2. Total contributions since prior valuation	\$ 18,216,116	\$ 16,937,907
3. Benefits, refunds, and admin expense since prior valuation	\$ (26,949,344)	\$ (24,096,515)
4. Assumed net investment income at 7.5%		
a. Beginning assets	\$ 27,080,281	\$ 25,875,706
b. Contributions	683,104	635,172
c. Benefits paid	(1,010,600)	(903,619)
d. Total	<u>\$ 26,752,785</u>	<u>\$ 25,607,259</u>
5. Expected actuarial assets (1 + 2 + 3 + 4d)	\$ 379,089,967	\$ 363,458,059
6. Actual actuarial assets, this valuation	\$ 374,943,903	\$ 361,070,410
7. Asset gain (loss) since prior valuation (6 - 5)	\$ (4,146,064) Loss	\$ (2,387,649) Loss

History of Investment Return Rates

For Fiscal Year Ending	Market Value	Actuarial Value
December 31, 2007	9.06%	11.17%
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%
Average Compound Returns		
Last 5 Years	7.78%	7.45%
Last 10 Years	4.32%	5.13%



Schedule of Funding Progress
Based on the Aggregate Funding Method
(As required by GASB #43)

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, 2006	\$ 249,299,172	\$ 258,726,894	\$ 9,427,721	96.4%	\$ 610,620,208	1.5%
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%)

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.

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, 2008	300,642,721	182,814,659	(117,828,062)	164.5%	679,223,009	(17.3%)
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%)

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.

History of Employer Contributions

<u>Valuation Date</u>	<u>Annual Required Contribution Rate</u>	<u>Actual Contribution Made *</u>	<u>Percentage Contributed</u>
January 1, 2005	0%	0%	100%
January 1, 2006	0%	0%	100%
January 1, 2007	0%	0%	100%
January 1, 2008	0%	0%	100%
January 1, 2009	0%	0%	100%
January 1, 2010	0%	0%	100%
January 1, 2011	0%	0%	100%
January 1, 2012	0%	0%	100%
January 1, 2013	0%	0%	100%
January 1, 2014	0%	0%	100%
January 1, 2015	0%	0%	100%
January 1, 2016	0%	0%	100%
January 1, 2017	0%	0%	100%

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

Solvency Test

Valuation Date	Aggregated Accrued Liabilities for			Actuarial Value of Assets	Portion of Accrued Liabilities Covered by Reported Assets		
	Active Members Contributions	Retirees	Members (Employer Financed Portion)		(5)/(2)	[(5)-(2)]/(3)	[(5)-(2)-(3)]/(4)
		Beneficiaries and Vested Terminations					
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
January 1, 2005	\$ 0	\$ 125,741	\$ 105,512	\$ 223,389	100%	100%	93%
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%

\$ amounts in '000s

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			
2005	\$ 7,093	\$ (11,856)	\$ 0	\$ (1,584)	\$ (13,440)	\$ (6,347)	\$ 254,275	(2.5%)
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*	21,089	(27,475)	0	(4,611)	(32,086)	(10,997)	376,394	(2.9%)
2018*	22,179	(29,330)	0	(4,773)	(34,103)	(11,924)	392,252	(3.0%)
2019*	23,123	(31,166)	0	(4,940)	(36,106)	(12,983)	408,201	(3.2%)

Results for 2017, 2018, & 2019 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% for 2017, 2018 and 2019, 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

**Annual Required Contribution
GASB #45**

Estimated Employer Annual Required Contribution (ARC)	\$	0
Net OPEB Obligation		
1. Net OPEB obligation as of January 1, 2017	\$	0
2. Estimated employer annual required contribution		0
3. Estimated employer contribution for 2017 plan year		0
4. Estimated net OPEB obligation as of December 31, 2017	\$	0

Notes to Required Supplementary Information
(As required by GASB #43)

Valuation date	January 1, 2017
Actuarial cost method	Aggregate
Amortization method	N/A
Remaining amortization period ¹	N/A
Asset valuation method	5-year smoothed fair value
Actuarial assumptions:	
Investment rate of return	7.50%
Projected salary increase	4.00% - 14%
Includes inflation at:	2.50%
Post-retirement benefit adjustments	0.00% - 3.00%

¹ Per GASB #43, Plans using the aggregate method must disclose a funding schedule and an equivalent single amortization period using the Entry Age Normal cost method. Per the Entry Age Normal method, the single amortization period as of January 1, 2017 is 0.5 years

Membership Data

	<u>January 1, 2017</u>	<u>January 1, 2016</u>	<u>January 1, 2015</u>
1. Active members			
a. Number	11,975	11,681	11,391
b. Total payroll	\$ 917,099,955	\$ 863,105,687	\$ 827,633,440
c. Average annual salary	\$ 76,585	\$ 73,890	\$ 72,657
d. Average age	41.5	41.7	41.8
e. Average service	11.1	11.3	11.5
2. Disabled members and beneficiaries			
a. Number	991	944	904
b. Total annual benefits	\$ 23,703,863	\$ 22,002,243	\$ 20,521,235
c. Average annual benefit	\$ 23,919	\$ 23,307	\$ 22,700
d. Average age	57.8	57.6	57.1
3. Survivors of deceased active members			
a. Number	120	119	116
b. Total annual benefits	\$ 2,876,276	\$ 2,892,842	\$ 2,760,729
c. Average annual benefit	\$ 23,969	\$ 24,310	\$ 23,799
d. Average age	54.9	55.0	54.3

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, 2005	10,031	39.6	10.1	\$ 560,172,994	\$55,844	2.16%
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%

**Distribution of Active Members by Age and by Years of Service
As of December 31, 2016**

Attained Age	Years of Credited Service												Total Count & Avg. Comp.
	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.	
Under 25	190 \$47,956	59 \$48,588	29 \$54,563	3 \$56,902									281 \$48,877
25-29	431 \$50,426	253 \$53,266	205 \$58,414	149 \$62,842	78 \$65,772	68 \$67,534							1,184 \$55,972
30-34	328 \$52,530	271 \$56,057	208 \$62,432	202 \$66,922	159 \$70,433	525 \$74,113	135 \$81,423						1,828 \$65,659
35-39	139 \$52,434	133 \$58,079	134 \$64,273	151 \$69,039	95 \$70,165	546 \$76,172	600 \$82,243	112 \$88,281					1,910 \$74,104
40-44	88 \$53,744	74 \$58,804	76 \$63,274	68 \$66,936	71 \$68,333	313 \$76,643	634 \$81,938	566 \$87,992	56 \$94,018				1,946 \$79,291
45-49	67 \$57,391	50 \$65,127	53 \$63,572	35 \$79,769	54 \$68,855	226 \$75,481	510 \$82,205	741 \$88,020	405 \$95,782	59 \$96,091			2,200 \$84,385
50-54	29 \$61,918	20 \$65,356	23 \$66,553	23 \$72,553	19 \$81,417	92 \$76,201	210 \$82,649	311 \$86,650	350 \$92,833	313 \$98,467	53 \$107,749		1,443 \$88,833
55-59	15 \$71,471	16 \$79,605	13 \$73,670	12 \$85,267	9 \$79,622	48 \$84,378	77 \$83,498	129 \$86,618	132 \$91,267	183 \$95,485	133 \$101,413	30 \$97,733	797 \$91,139
60-64	8 \$71,703	8 \$88,131	7 \$80,075	6 \$79,152	7 \$55,379	20 \$72,703	29 \$81,413	36 \$88,441	41 \$90,580	39 \$91,721	36 \$95,502	69 \$99,163	306 \$89,124
65 & Over	2 \$121,332	3 \$43,862	6 \$86,948	2 \$74,977	1 \$51,265	6 \$96,468	10 \$98,566	7 \$88,389	4 \$101,136	5 \$107,053	12 \$87,422	22 \$100,942	80 \$93,624
Total	1,297 \$52,137	887 \$56,690	754 \$62,207	651 \$67,800	493 \$69,507	1,844 \$75,506	2,205 \$82,242	1,902 \$87,717	988 \$93,840	599 \$96,954	234 \$101,221	121 \$99,132	11,975 \$76,585
Average:		Age: Service:	41.5 11.1				Number of participants:				Males: Females:	10,851 1,124	

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, 2004	50	\$ 752,870	9	\$ 123,720	657	\$ 11,436,494	5.82%	\$ 17,407
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

*Includes benefit adjustments

Summary of Members and Adjusted Payroll by Employer

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
3	ALAMOSA	24	\$ 1,163,530	0	\$ 0	24	\$ 1,163,530
4	ALMA	1	46,000	0	0	1	46,000
5	ANTONITO	2	57,998	0	0	2	57,998
7	ARVADA	170	14,051,771	0	0	170	14,051,771
8	ASPEN	25	1,752,103	0	0	25	1,752,103
9	AULT	5	232,589	0	0	5	232,589
10	AURORA	694	56,679,884	329	25,607,909	1,023	82,287,793
11	AVON	17	1,259,593	0	0	17	1,259,593
12	BASALT	10	795,233	0	0	10	795,233
13	BAYFIELD	8	430,212	0	0	8	430,212
18	BLANCA	1	36,858	0	0	1	36,858
22	BOULDER	178	14,790,441	114	9,971,902	292	24,762,343
26	BRIGHTON (GREATER) FPD	0	0	66	4,649,536	66	4,649,536
27	BROOMFIELD	159	13,088,851	0	0	159	13,088,851
28	BRUSH	11	527,960	0	0	11	527,960
29	BUENA VISTA	8	435,208	0	0	8	435,208
33	CANON CITY	31	1,519,897	0	0	31	1,519,897
35	CASTLE ROCK	0	0	79	6,745,118	79	6,745,118
37	CENTER	8	309,673	0	0	8	309,673
38	CENTRAL CITY	0	0	1	79,515	1	79,515
40	CHERRY HILLS VILLAGE	23	1,927,285	0	0	23	1,927,285
44	COLLBRAN MARSHALS	2	90,741	0	0	2	90,741
45	COLORADO SPRINGS	642	47,995,359	386	31,000,648	1,028	78,996,007
46	COLUMBINE VALLEY	6	343,272	0	0	6	343,272
47	COMMERCE CITY	90	7,156,813	0	0	90	7,156,813
48	CORTEZ	32	1,583,267	0	0	32	1,583,267
57	DACONO	10	597,654	0	0	10	597,654
58	DEBEQUE POLICE	4	220,332	0	0	4	220,332
60	DEL NORTE	2	106,601	0	0	2	106,601
61	DELTA	18	993,806	0	0	18	993,806

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
62	DENVER	1,392	\$ 119,274,425	888	\$ 76,985,429	2,280	\$ 196,259,854
63	DILLON	10	657,619	0	0	10	657,619
67	DURANGO	52	3,490,001	0	0	52	3,490,001
73	EDGEWATER	16	1,013,582	0	0	16	1,013,582
74	ELIZABETH	5	312,236	0	0	5	312,236
75	EMPIRE	1	52,000	0	0	1	52,000
76	ENGLEWOOD	72	5,778,171	0	0	72	5,778,171
77	ERIE	26	1,890,393	0	0	26	1,890,393
79	EVANS	34	2,288,651	0	0	34	2,288,651
80	FAIRPLAY MARSHALLS	3	157,558	0	0	3	157,558
81	FEDERAL HEIGHTS	21	1,430,237	16	969,389	37	2,399,626
82	STONE MARSHALLS	21	1,376,690	0	0	21	1,376,690
85	FLORENCE	11	460,920	0	0	11	460,920
86	FORT COLLINS	236	19,236,586	1	81,510	237	19,318,096
87	FORT LUPTON	16	975,761	0	0	16	975,761
88	FORT MORGAN	26	1,464,185	0	0	26	1,464,185
89	FOUNTAIN	50	3,110,824	27	1,541,711	77	4,652,535
90	FOWLER	3	117,735	0	0	3	117,735
93	FRISCO	12	746,545	0	0	12	746,545
94	FRUITA	17	1,002,271	0	0	17	1,002,271
97	GEORGETOWN	3	178,856	0	0	3	178,856
99	GLENDALE	26	1,842,481	0	0	26	1,842,481
100	GLENWOOD SPRINGS	26	1,770,943	23	1,599,985	49	3,370,928
101	GOLDEN	43	3,402,586	8	600,662	51	4,003,248
102	GRANADA	1	29,664	0	0	1	29,664
104	GRAND JUNCTION	111	8,673,327	110	8,385,298	221	17,058,625
106	PARACHUTE	4	219,743	0	0	4	219,743
107	GREELEY	152	11,951,499	94	7,334,697	246	19,286,196
109	GREENWOOD VILLAGE	64	5,188,352	0	0	64	5,188,352
115	HAXTUN POLICE	3	119,718	0	0	3	119,718

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
119	HOLYOKE	4	\$ 155,967	0	\$ 0	4	\$ 155,967
124	HUGO	2	75,120	0	0	2	75,120
125	IDAHO SPRINGS	7	387,971	0	0	7	387,971
126	IGNACIO	7	408,717	0	0	7	408,717
129	JOHNSTOWN	17	1,034,965	0	0	17	1,034,965
137	LAFAYETTE	40	3,063,922	22	1,407,486	62	4,471,408
138	LA JARA	3	133,398	0	0	3	133,398
139	LA JUNTA	10	458,526	6	257,380	16	715,906
141	LARKSPUR FPD	0	0	15	837,265	15	837,265
143	LAMAR	18	932,464	9	415,186	27	1,347,650
144	LA SALLE	8	454,339	0	0	8	454,339
146	LA VETA	2	71,701	0	0	2	71,701
147	LEADVILLE	9	366,583	11	521,216	20	887,799
149	LITTLETON	71	5,989,588	155	13,072,578	226	19,062,166
150	LOCHBUIE	10	587,756	0	0	10	587,756
151	LONGMONT	143	11,379,860	88	7,478,675	231	18,858,535
153	LOVELAND	107	8,750,289	0	0	107	8,750,289
155	MANASSA	1	39,000	0	0	1	39,000
157	MANITOU SPRINGS	14	723,923	6	328,823	20	1,052,746
163	MILLIKEN	9	507,232	0	0	9	507,232
166	MONTE VISTA	11	443,571	0	0	11	443,571
167	MONTROSE	36	2,123,401	0	0	36	2,123,401
170	MOUNTAIN VIEW	8	392,160	0	0	8	392,160
175	NORTHGLENN	66	4,684,206	0	0	66	4,684,206
178	NUNN POLICE	1	43,776	0	0	1	43,776
179	OAK CREEK	2	103,979	0	0	2	103,979
180	OLATHE	5	224,995	0	0	5	224,995
188	PAGOSA SPRINGS	8	391,153	0	0	8	391,153
189	PALISADE	8	438,769	2	126,029	10	564,798
190	PALMER LAKE	2	116,667	3	137,925	5	254,592

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
191	PARKER	72	\$ 5,796,036	0	\$ 0	72	\$ 5,796,036
192	PAONIA	2	86,823	0	0	2	86,823
196	PLATTEVILLE	7	345,397	0	0	7	345,397
199	PUEBLO	188	12,687,366	129	8,603,803	317	21,291,169
201	RANGELY	5	350,146	0	0	5	350,146
206	RIFLE	21	1,321,510	0	0	21	1,321,510
208	ROCKY FORD	9	303,397	5	171,733	14	475,130
213	SALIDA	14	687,638	10	547,371	24	1,235,009
214	LOG LANE VILLAGE	4	144,915	0	0	4	144,915
215	SANFORD	1	33,732	0	0	1	33,732
220	SHERIDAN	30	1,992,540	0	0	30	1,992,540
222	SILT	6	310,380	0	0	6	310,380
228	SNOWMASS VILLAGE	9	674,437	0	0	9	674,437
229	SPRINGFIELD	4	156,098	0	0	4	156,098
231	STEAMBOAT SPRINGS	23	1,646,488	27	1,661,800	50	3,308,288
232	STERLING	20	980,404	22	940,295	42	1,920,699
233	STRATTON	1	50,534	0	0	1	50,534
237	TELLURIDE	10	690,310	0	0	10	690,310
238	THORNTON	0	0	104	7,930,877	104	7,930,877
240	TRINIDAD	22	1,052,243	16	836,012	38	1,888,255
242	VAIL	30	2,326,212	29	2,131,060	59	4,457,272
247	WALSENBURG	4	166,527	0	0	4	166,527
252	WESTMINSTER	0	0	123	9,749,901	123	9,749,901
253	WHEAT RIDGE	75	5,784,438	0	0	75	5,784,438
254	WIGGINS	2	65,966	0	0	2	65,966
259	WOODLAND PARK	18	985,314	0	0	18	985,314
260	WRAY	6	316,360	0	0	6	316,360
262	YUMA	7	320,164	0	0	7	320,164
263	LAKESIDE	5	258,066	0	0	5	258,066
266	MOUNTAIN VILLAGE	5	312,169	0	0	5	312,169

**Fire and Police Pension Association
Statewide Death & Disability Fund
Actuarial Valuation – January 1, 2017**

**Section III
Table 21**

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
268	LONE TREE	51	\$ 3,668,569	0	\$ 0	51	\$ 3,668,569
326	BRIGHTON	60	4,250,280	0	0	60	4,250,280
330	CANON CITY POLICE - DB SELECTION	1	86,439	0	0	1	86,439
338	THORNTON	213	16,057,642	0	0	213	16,057,642
501	ARVADA FPD	0	0	156	13,225,447	156	13,225,447
503	BERTHOUD FPD	0	0	23	1,217,663	23	1,217,663
504	BROADMOOR FPD	0	0	4	273,308	4	273,308
505	CHERRY HILLS FPD	0	0	5	481,651	5	481,651
506	CUNNINGHAM FPD	0	0	61	4,979,284	61	4,979,284
507	EAST GRAND FPD #4	0	0	5	287,337	5	287,337
509	CLIFTON FPD	0	0	14	893,022	14	893,022
510	FAIRMOUNT FPD	0	0	24	1,378,139	24	1,378,139
511	FRANKTOWN FPD	0	0	18	1,041,956	18	1,041,956
512	GREEN MTN FALLS/CHIPITA	0	0	1	50,104	1	50,104
513	PLATTEVILLE/GILCREST FPD	0	0	20	1,273,753	20	1,273,753
515	ELIZABETH FPD	0	0	17	1,015,440	17	1,015,440
516	MOUNTAIN VIEW FPD	0	0	85	6,890,187	85	6,890,187
518	POUDRE AUTHORITY	0	0	176	15,124,859	176	15,124,859
519	PUEBLO RURAL FPD	0	0	28	1,374,414	28	1,374,414
521	RED WHITE & BLUE FPD	0	0	51	3,724,117	51	3,724,117
522	EAGLE RIVER FPD	0	0	64	4,110,565	64	4,110,565
523	ESTES VALLEY FPD	0	0	4	283,769	4	283,769
524	SNOWMASS WILDCAT FPD	0	0	18	1,423,555	18	1,423,555
525	SOUTH ADAMS COUNTY FPD	0	0	48	2,802,078	48	2,802,078
531	COLORADO RIVER FIRE RESCUE AUTHORITY	0	0	50	2,881,242	50	2,881,242
532	NORTH METRO RESCUE	0	0	119	9,573,553	119	9,573,553
533	CANON CITY AREA FPD	0	0	31	2,041,759	31	2,041,759
534	WEST METRO FPD	0	0	313	26,334,204	313	26,334,204
537	MONTROSE FPD	0	0	34	2,420,049	34	2,420,049
538	BEULAH FIRE PROTECTION & AMBULANCE DISTRICT	0	0	1	54,600	1	54,600

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
540	SOUTH METRO RESCUE	0	\$ 0	313	\$ 28,765,944	313	\$ 28,765,944
542	SABLE-ALTURA FPD	0	0	7	211,612	7	211,612
543	SECURITY FPD	0	0	34	1,390,911	34	1,390,911
545	TELLURIDE FPD	0	0	7	548,867	7	548,867
548	SOUTHERN PARK COUNTY FPD	0	0	1	32,000	1	32,000
550	ADAMS COUNTY FPD	0	0	99	8,153,608	99	8,153,608
566	DONALD WESCOTT FPD	0	0	17	1,028,080	17	1,028,080
567	DURANGO & RESCUE AUTH	0	0	67	4,646,223	67	4,646,223
574	LEFTHAND FPD	0	0	2	174,000	2	174,000
578	LOS PINOS FPD	0	0	19	1,059,348	19	1,059,348
579	EVANS	0	0	16	974,861	16	974,861
580	BLACK FOREST RESCUE	0	0	11	599,151	11	599,151
588	PAGOSA FPD	0	0	7	400,999	7	400,999
592	FREDERICK STONE FPD	0	0	43	2,761,698	43	2,761,698
593	LAKE DILLON FPD	0	0	48	3,637,164	48	3,637,164
595	UPPER PINE RIVER FPD	0	0	31	1,513,934	31	1,513,934
711	ASPEN FPD	0	0	2	247,074	2	247,074
718	BENNETT FPD #7	0	0	11	561,655	11	561,655
719	BASALT & RURAL FPD	0	0	8	706,727	8	706,727
723	BLACK HAWK	0	0	19	1,611,491	19	1,611,491
726	BOULDER MOUNTAIN AUTH	0	0	4	207,922	4	207,922
730	BOULDER RURAL FPD	0	0	15	1,288,105	15	1,288,105
735	BYERS FPD #9	0	0	1	40,000	1	40,000
740	CARBONDALE AND RURAL FPD	0	0	17	1,131,458	17	1,131,458
749	CHAFFEE COUNTY FPD	0	0	4	194,996	4	194,996
752	ROCKY MOUNTAIN FPD	0	0	37	3,063,796	37	3,063,796
754	CIMARRON HILLS FPD	0	0	13	796,042	13	796,042
757	COAL CREEK CANYON FPD	0	0	1	67,500	1	67,500
764	COPPER MOUNTAIN	0	0	16	978,851	16	978,851
765	CORTEZ FPD	0	0	14	576,427	14	576,427

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
772	CRESTED BUTTE	0	\$ 0	8	\$ 429,988	8	\$ 429,988
774	CRIPPLE CREEK	0	0	13	697,738	13	697,738
779	DEBEQUE FPD	0	0	7	508,790	7	508,790
795	EATON FPD	0	0	14	643,642	14	643,642
810	FEDERAL HEIGHTS FIRE	0	0	1	106,416	1	106,416
1790	OAK CREEK POLICE CHIEF @ SWDB RATES	1	70,736	0	0	1	70,736
2153	LOVELAND FRA	0	0	85	6,465,390	85	6,465,390
2400	TRINIDAD FIRE - DB SELECTION	0	0	1	52,067	1	52,067
2520	WESTMINSTER FIRE - DB SELECTION	0	0	2	165,791	2	165,791
2557	TRI-LAKES MONUMENT FPD	0	0	43	2,551,259	43	2,551,259
3260	BRIGHTON POLICE - DB SELECTION	1	131,753	0	0	1	131,753
5030	BERTHOUD FPD	0	0	2	196,929	2	196,929
5136	KREMMLING FPD	0	0	1	62,700	1	62,700
5339	SOUTH FORK	0	0	3	130,774	3	130,774
5340	WEST METRO FPD - DB SELECTION	0	0	32	3,193,417	32	3,193,417
7102	ELK CREEK FPD	0	0	10	573,538	10	573,538
7109	EVERGREEN FPD	0	0	1	89,225	1	89,225
7112	FALCON FPD	0	0	18	1,080,726	18	1,080,726
7122	FORT LEWIS-MESA FPD	0	0	2	121,165	2	121,165
7123	FORT LUPTON FPD	0	0	24	1,253,233	24	1,253,233
7125	CLEAR CREEK AUTHORITY	0	0	3	169,453	3	169,453
7131	FRONT RANGE FRA	0	0	23	1,310,643	23	1,310,643
7132	GALETON FPD	0	0	1	65,000	1	65,000
7136	GENESEE	0	0	2	133,200	2	133,200
7147	GRAND FPD #1	0	0	3	179,457	3	179,457
7149	GRAND LAKE FPD	0	0	5	277,738	5	277,738
7150	GRAND VALLEY FPD	0	0	21	1,491,674	21	1,491,674
7153	GREATER EAGLE FPD	0	0	15	852,826	15	852,826
7156	GYPSUM FPD	0	0	4	280,972	4	280,972
7158	HARTSEL FPD	0	0	1	52,500	1	52,500

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
7176	HUDSON FPD	0	\$ 0	20	\$ 926,446	20	\$ 926,446
7179	HYGIENE FPD	0	0	1	64,176	1	64,176
7185	INDIAN HILLS FPD	0	0	1	43,128	1	43,128
7187	INTER-CANYON FPD	0	0	1	78,000	1	78,000
7191	JEFFERSON-COMO FPD	0	0	6	239,731	6	239,731
7198	KIOWA FPD	0	0	2	93,799	2	93,799
7206	LAKE GEORGE FPD	0	0	1	51,054	1	51,054
7211	LA SALLE FPD	0	0	9	570,082	9	570,082
7222	FOOTHILLS & RESCUE	0	0	3	173,422	3	173,422
7226	LOWER VALLEY FPD	0	0	11	646,378	11	646,378
7227	LYONS FPD	0	0	1	72,683	1	72,683
7246	NEDERLAND FPD	0	0	4	232,855	4	232,855
7251	NORTH FORK FPD	0	0	1	63,447	1	63,447
7253	NORTH ROUTT COUNTY	0	0	1	62,839	1	62,839
7255	NORTHEAST TELLER COUNTY	0	0	14	848,469	14	848,469
7259	NORTH-WEST FPD	0	0	10	472,906	10	472,906
7263	OAK CREEK FPD	0	0	3	161,345	3	161,345
7285	PLATTE CANYON FPD	0	0	13	831,967	13	831,967
7287	PLATTE VALLEY FPD	0	0	17	1,006,861	17	1,006,861
7289	PLEASANT VIEW METRO	0	0	4	242,998	4	242,998
7294	PUEBLO W. METRO	0	0	21	1,059,520	21	1,059,520
7298	RATTLESNAKE FPD	0	0	3	168,779	3	168,779
7307	RIO BLANCO FPD	0	0	1	72,999	1	72,999
7314	RYE FPD	0	0	6	232,358	6	232,358
7331	BIG SANDY FPD	0	0	1	33,681	1	33,681
7339	SOUTH FORK	2	94,828	0	0	2	94,828
7340	SOUTHEAST WELD FPD	0	0	17	800,340	17	800,340
7348	STRASBURG FPD #8	0	0	3	122,799	3	122,799
7349	STRATMOOR HILLS FPD	0	0	6	269,467	6	269,467
7353	TIMBERLINE FPD FIRE CHIEF @SWDB RATES	0	0	1	90,000	1	90,000

**Fire and Police Pension Association
 Statewide Death & Disability Fund
 Actuarial Valuation – January 1, 2017**

*Section III
 Table 21*

City Code	City Name	Police		Fire		Total	
		No.	Earnings	No.	Earnings	No.	Earnings
7354	TIMBERLINE FPD	0	0	1	45,975	1	45,975
7369	WELLINGTON	0	0	14	788,853	14	788,853
7373	WEST DOUGLAS COUNTY	0	0	1	85,999	1	85,999
7375	WEST ROUTT FPD	0	0	9	254,423	9	254,423
7384	WINDSOR SEVERANCE FPD	0	0	43	2,347,407	43	2,347,407
7481	PLATEAU VALLEY FPD	0	0	6	376,950	6	376,950
Totals		6,196	\$ 475,096,345	5,779	\$ 442,003,610	11,975	\$ 917,099,955

Summary of Inactive Members

	<u>Count</u>	<u>Average Age</u>	<u>Average Monthly Benefit</u>
Totally Disabled Members*	139	58.4	\$3,129
Occupationally Disabled Members*	852	57.7	\$1,808
Beneficiaries of Deceased Active Members	120	54.9	\$1,997

* 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 2016	Males	Females	Attained Age in 2016 (cont.)	Males	Females
(1)	(2)	(3)	(4)	(5)	(6)
50	2.17	1.23	70	19.10	13.63
55	3.68	1.97	75	30.57	22.42
60	7.24	4.62	80	50.31	37.25
65	12.31	8.52	85	84.25	63.46

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:

Year of Retirement				
Gender	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 2016	Males	Females	Attained Age in 2016 (cont.)	Males	Females
(1)	(2)	(3)	(4)	(5)	(6)
50	2.94	1.59	70	25.23	18.36
55	5.56	3.33	75	41.11	30.33
60	10.18	6.89	80	68.46	51.15
65	15.95	11.24	85	115.68	87.88

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 2016	Males	Females	Attained Age in 2016 (cont.)	Males	Females
(1)	(2)	(3)	(4)	(5)	(6)
50	30.00	20.00	70	39.14	27.53
55	30.00	20.00	75	52.67	40.07
60	30.00	20.00	80	74.33	59.58
65	30.93	20.36	85	109.93	88.26

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 2016	Males	Females	Attained Age in 2016 (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	0.89	0.60
30	0.52	0.33	50	1.39	0.88
35	0.57	0.38	55	2.17	1.22

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 Defined Benefit 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 Defined Benefit 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 1, 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. On-duty 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 1, 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.

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 his/her service requirement for purposes of Normal retirement while exhausting accumulated vacation leave.
- 3) 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 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).
- 4) 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.
- 5) Any amounts voluntarily contributed to an Internal Revenue Code Section 125 "Cafeteria Plan" shall be included in the Member's base salary. A Member is deemed temporarily acting in a higher rank if the appointment to the rank is anticipated to last less than six months.
- 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 will increase 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. Benefits will be paid to the spouse until death and to dependent children until, death, marriage or other termination of dependency.

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 his/her 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, he shall receive 70 percent of his base salary preceding disability.

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

In addition to a monthly life annuity, the Plan offers disabled members these optional forms of payment on an actuarially equivalent basis:

Option 1 (Joint and 100% Survivor) - A life annuity payable while either the participant or his beneficiary is alive.

Option 2 (Joint and 50% Survivor) - A life annuity payable to the member while the member is alive, reducing to 50 percent of this amount and payable to the beneficiary upon the member's death.

Option 3 (Family Benefit) - A life annuity payable to the member while both the member and beneficiary are alive. If the member dies, the survivor annuity will continue until the surviving spouse dies, until the youngest child reaches 23, or until death of any incapacitated child, whichever is later.

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.

SUPPLEMENTAL STUDIES

Colorado Revised Statutes state: “Any benefit provided in accordance with section 31-31-803(2) to a surviving spouse of a member who was occupationally disabled shall terminate upon the remarriage of the surviving spouse.”

Section 31-31-803(2) pertains to Occupational Disability retirements prior to October 1, 2002, and in particular, the spousal portion of the benefit.

Under the study, this particular clause would be eliminated and survivors of old occupational disabled members would be able to remarry without fear of financial impact.

Currently, there is no remarriage assumption in the valuation. If a surviving spouse would remarry and FPPA would terminate their benefit, the plan would have an actuarial gain from this event. By eliminating this clause, the plan would have a loss of a potential future gain rather than a direct actuarial impact.

Currently, the total liability associated with the surviving spouses of Old Occupational Disability retirements is \$2.3 million. This includes payments to current surviving spouses as well as payments to future surviving spouses of current Old Occupational Disability retirees.

There is not a lot of data available to develop a remarriage assumption, particularly in this instance where there is disincentive to remarry. From the information available, there have only been six survivors who lost the spousal portion due to this remarriage clause since 1983. If we conservatively estimate that 10% of surviving spouses will remarry, then the financial impact to the Present Value of Benefits is less than \$230,000. For current surviving spouses, any delay in remarriage from the valuation date would serve to reduce the \$230,000 and for future surviving spouses, any delay in remarriage from the retiree’s date of death would serve to reduce the \$230,000.

Reducing the Present Value of Benefits by \$230,000 does not have sufficient impact to change the calculated contribution of 2.48%.