

# Fire and Police Pension Association Colorado Springs New Hire Pension Plan – Police Component

Actuarial Valuation Report  
For the Year Beginning January 1, 2019



To: Board of Directors for the Fire and Police Pension Association

CC: Administrative Heads and Finance Officers of the City of Colorado Springs

Date: June 2019

Subject: **Actuarial Valuation Results as of January 1, 2019**

---

This report contains the actuarial valuation results as of January 1, 2019 for the Colorado Springs New Hire Pension Plan – Police Component as determined by Gabriel, Roeder, Smith & Company (GRS), actuary for the Fire and Police Pension Association (FPPA). Questions about this report should be directed to FPPA, rather than to Gabriel, Roeder, Smith & Company.

### **Financing Objectives**

This valuation was prepared to determine the actuarially determined contribution (ADC) for fiscal year 2020. The ARC for FY2020 is \$11,420,163 and is shown in Table 1, Item 9.

The calculated employer contribution consists of the sum of two pieces: the normal cost and the amortization of the unfunded actuarial accrued liability (UAAL). The calculated contribution is shown in Table 1, Item 9. The normal cost (shown in Table 1, Item 2) can be viewed as the regular, ongoing cost of the Plan.

The UAAL is the amount by which the actuarial value of assets falls short of, or exceeds, the actuarial accrued liability for this Plan. Under the current funding policy, the UAAL must be amortized under a level dollar method over a period of 20 years. The determined payment to amortize the UAAL is shown in Table 1, Item 8.

The Actuarially Determined Contribution may be considered as a minimum contribution rate that complies with state statute. Users of this report should be aware that contributions made at that rate do not guarantee benefit security. Given the importance of benefit security to any retirement system, we suggest that contributions to the Plan in excess of those presented in this report be considered.

The contribution rate in this report is determined using the actuarial assumptions and methods disclosed in Table 13 of this report. Page 3 of this letter includes short term projections assuming alternate investment returns. With the exception of these short term funding projections, this report does not include an assessment of the risks of future experience not meeting the actuarial assumptions. Additional assessment of risks was outside the scope of this

assignment. We encourage a review and assessment of investment and other significant risks that may have a material effect on the plan's financial condition.

### **Benefit Provisions**

This actuarial valuation reflects the provisions that were applicable to the Colorado Springs New Hire Pension Plan – Police Component as of the valuation date. The details of the actuarial calculations, based on the current benefit provisions, are described in this report.

### **SRA Contributions**

As of January 1, 2019, the combined member/employer contribution rate is over 16.00% and therefore we recommend the SRA contribution rate be set to 0.00% as of January 1, 2020.

### **Actuarial Assumptions and Methods**

Since the prior valuation, new actuarial assumptions were adopted by the Board of Directors of FPPA based on the actuary's analysis and recommendation from the 2018 Experience study.

Below is a summary of changes in assumptions:

1. Reduce the real return from 5.0% to 4.50% to reflect reduced real return expectations. Combined with an unchanged inflation rate of 2.50%, reduce the nominal investment assumption from 7.50% to 7.00%.
2. Increase the productivity component of the salary scale assumption from 1.50% to 1.75%. Combined with the inflation rate of 2.50%, this creates an ultimate salary scale assumption of 4.25%. In accordance with the observed experience, slightly lower the service-based promotional/longevity component of the salary scale.
3. Remove the blue-collar adjustment from the mortality tables being used and update the mortality projection scale from Scale BB to the ultimate rates of the MP-2017 projection scale.
4. Increase disability rates for members covered by a defined benefit program.
5. Slightly modify retirement rates to reflect increased retirement utilization for low service members and slightly decreased normal retirement rates after age 55.

The assumptions and methods are detailed in Table 13 of the 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.

Because the plan is closed to new members, the amortization period was closed at 30 years effective January 1, 2008.



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. Even seemingly minor changes in the assumptions can materially change the liabilities, calculated contribution and funding periods. The actuarial calculations are intended to provide information for rational decision making.

### **Assets**

Table 4 shows the market value of assets for this department and Table 5 shows the development of the actuarial value. 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. This smoothed average approach is intended to ensure the smoothed value of assets will converge towards the market value in a reasonable amount of time.

### **Member Data**

Member data as of January 1, 2019 was supplied by FPPA, as supplied by the department throughout the normal course of business. GRS reviewed the data and tested it for reasonableness and consistency. The member count is shown in Table 3.

### **Experience**

The plan experienced an increase in its calculated contribution between the 2018 actuarial valuation and this valuation. This increase was primarily due to changes in the assumptions and less than favorable asset returns. Additionally, there were liability losses from salary experience. This was partially offset due to the expected reductions in the normal cost for the closed.

**Deferred Losses and Projected Actuarial Results**

To allow the City to anticipate future contribution requirements for the Fund, we have projected the actuarial status of the Fund as of January 1, 2019. The table below provides the ADC for Fiscal Years 2020 - 2024 based on the January 1, 2019 actuarial valuation.

	Actuarially Determined Contribution (ADC)		
Fiscal Year	Assuming 3.0%	Assuming 7.0%	Assuming 11.0%
(FY)	return in FY	return in FY	return in FY
2020	\$11,420,163	\$11,420,163	\$11,420,163
2021	11,832,196	11,571,581	11,252,329
2022	12,429,985	11,613,059	10,656,191
2023	13,354,679	11,647,024	9,668,541
2024	14,669,548	11,694,741	8,234,770

The projected liabilities are calculated by rolling forward the liabilities as of January 1, 2019, taking into account interest and benefit payments for the year, including mortality incidence and anticipated cost of living increases. The 7.0% scenario above coincides with the actuarial investment return assumption of 7.0%. The 3.0% and 11.0% scenarios were selected because there is statistically a high probability of the return for a two year period being inside the expected return +/- 4%.

The scenarios above are for illustration purposes only and are in no way to be used as expected investment performance. There are no other deviations from the expected taken into consideration besides the asset performance. Careful consideration of this projected contribution should be taken into account before any benefit enhancement is adopted.

**Trends**

As of January 1, 2019, there remains \$11.1 million of deferred asset losses that will increase future contribution levels, in the absence of offsetting gains. Additionally, it is anticipated that the dollar normal cost will continue to decrease over time.

**Tables**

This report includes the following sections:

- The executive summary includes a condensed summary of the demographic, financial, and actuarial data.
- Table 1 provides the details of the development of the determined contribution.



- Table 2 shows the sources of change in the calculated contribution since the prior valuation.
- Table 3 shows historical actuarial and demographic data for the department.
- Tables 4, 5, and 6 show the development of the financial information.
- Table 7 provides historical funding information.
- Table 8 provides the solvency test.
- Table 9 shows historical cash flow information.
- Tables 10, 11, and 12 show demographic data for the department.
- Table 13 shows the actuarial assumptions and methods used to calculate the liabilities.
- Table 14 is a summary of the benefit provisions for the department.
- Table 15 provides definitions of several terms used throughout the report.
- Table 16 provides a 5 year deterministic projection
- Table 17 provides Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

### **GASB Accounting**

The Governmental Accounting Standards Board (GASB) Statement No. 67, Financial Reporting for Pension Plans (Issued 6/2012), has replaced the requirements under GASB Statement No. 25, Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans (Issued 11/1994), effective for financial statements for fiscal years beginning after June 15, 2013. GASB Statement No. 68, Accounting and Financial Reporting for Pensions (Issued 6/2012), has replaced GASB Statement No. 27, Accounting for Pensions by State and Local Governmental Employers (Issued 11/1994), effective for fiscal years beginning after June 15, 2014. Plan reporting information for GASB Statement No. 67 can be found in the FPPA Comprehensive Annual Financial Report at FPPA's website - FPPAco.org. Colorado Springs receives a separate accounting report in order to meet their financial reporting requirements under GASB 68.

### **Certification**

We certify that the information included herein and contained in the 2019 Actuarial Valuation Report is accurate and fairly presents the actuarial position of the Colorado Springs New Hire Police Pension Fund as of January 1, 2019.

All calculations have been made in conformity with generally accepted actuarial principles and practices, and with the Actuarial Standards of Practice issued by the Actuarial Standards Board. In our opinion, the results presented comply with the requirements of the State of Colorado statutes 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  
Senior Consultant



Dana Woolfrey, FSA, EA, MAAA  
Consultant



## Executive Summary

Item	January 1, 2019	January 1, 2018
<b>Membership</b>		
• Number of:		
- Active members	268	283
- Terminated vested members	15	17
- Inactive members	6	7
- Members in DROP	55	63
- Retired members	251	231
- Beneficiaries	13	12
- Total	608	613
• Annualized payroll supplied by FPPA	\$ 23,137,303	\$ 23,039,390
• Annualized monthly benefits paid	\$ 14,213,941	\$ 13,430,855
<b>Assets</b>		
• Market value	\$ 311,369,449	\$ 315,606,098
• Actuarial value	\$ 322,447,392	\$ 308,034,365
• Return on market value	0.0 %	14.8 %
• Return on actuarial value	6.1 %	8.2 %
• Contribution	\$ 9,813,515	\$ 10,752,643
• Ratio of actuarial value to market value	103.6 %	97.6 %
<b>Actuarial Information</b>		
• Actuarial accrued liability	\$ 383,230,807	\$ 342,817,503
• Actuarial Value Basis		
- Unfunded actuarial accrued	\$ 60,783,415	\$ 34,783,138
- Funded ratio	84.1 %	89.9 %
• Market Value Basis		
- Unfunded actuarial accrued	\$ 71,861,358	\$ 27,211,405
- Funded ratio	81.2 %	92.1 %
• Amortization period (years)	19	20
<b>Actuarially Determined Contribution (ADC)</b>		
• For year ending December 31,	2020	2019
• Estimated contribution amount	\$ 11,420,163	\$ 8,037,168



## Table of Contents

Table 1: Development of Actuarially Determined Contribution	3
Table 2: Change in UAAL/Calculated Contribution	4
Table 3: Actuarial Experience	5
Table 4: Reconciliation of Net Plan Assets	6
Table 5: Development of Actuarial Value of Assets	7
Table 6: Gain/Loss on Assets	8
Table 7: Statement of Funding Progress	9
Table 8: Solvency Test	10
Table 9: Cash Flow Analysis	11
Table 10: Membership Data	12
Table 11: Summary of Retirees by Age and Type	13
Table 12: Added and Removed from Rolls	14
Table 13: Summary for Actuarial Assumptions, Methods, and Changes	15
Table 14: Summary of Benefit Provisions	20
Table 15: Definition of Terms	24
Table 16: 5 Year Deterministic Projection	26
Table 17: Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution	28

## Table 1 – Development of Actuarially Determined Contribution

	January 1, 2019	After Assumption Changes January 1, 2018	Before Assumption Changes January 1, 2018
1. Valuation payroll	\$ 23,137,303	23,039,390	\$ 23,039,390
2. Normal cost	\$ 5,264,460	5,342,494	\$ 4,733,647
3. Administrative Expenses	\$ 145,894	131,754	\$ 131,754
4. Actuarial accrued liability for active members			
a. Present value of future benefits for active members	\$ 190,713,200	183,768,971	\$ 169,484,580
b. Less: present value of future normal costs	(31,716,323)	(34,940,088)	(30,131,938)
c. Actuarial accrued liability (a. + b.)	\$ 158,996,877	148,828,883	\$ 139,352,642
5. Total actuarial accrued liability for:			
a. Retirees and beneficiaries	\$ 166,189,863	149,133,179	\$ 142,294,280
b. Terminated vested members	4,184,182	4,523,114	4,184,476
c. Inactive members	810,342	1,117,226	1,117,226
d. Members in DROP	53,049,543	58,781,543	55,868,879
e. Active members (4c.)	158,996,877	148,828,883	139,352,642
f. Total	\$ 383,230,807	362,383,945	\$ 342,817,503
6. Actuarial value of assets	\$ 322,447,392	308,034,365	\$ 308,034,365
7. Unfunded actuarial accrued liability (UAAL)/(surplus) (5f. - 6.)	\$ 60,783,415	54,349,580	\$ 34,783,138
8. Funded ratio	84.14 %	85.00	89.85 %
9. Determined payment to amortize the UAAL/(surplus) over 19 years from January 1, 2019	\$ 6,009,809	5,065,038	\$ 3,171,767
10. Total calculated annual contribution for Fiscal Year:			
Actuarially Determined Contribution (2. + 3. + 9.)	\$ 11,420,163	10,539,286	\$ 8,037,168
11. Total present value of benefits (5f. - 4b.)	\$ 414,947,130	397,324,033	\$ 372,949,441

## Table 2 – Actuarial Gain/(Loss) on UAAL

1. Unfunded actuarial accrued liability (UAAL)	\$	34,783,138
b) UAAL after the assumption change		54,349,580
2. Total normal cost for FY2018		5,527,257
3. Non Service Purchase Contributions during 2018		(9,512,689)
4. Administrative Expenses FY2018		145,894
5. a) Interest on Item 1 for one year		2,434,820
b) Interest on Item 2, 3, and Item 4 for one-half year *		(134,384)
6. Change in UAAL due to:		
a. Benefit Improvements		0
b. Assumption Changes (included in 1b.)		19,566,442
7. Expected UAAL as of this valuation (1b.+2.+3.+4.+5.)		52,810,477
8. Actual UAAL at end of period		60,783,415
9. Actuarial gain/(loss) for the period (8. – 7.)		(7,972,938)
<u>SOURCE OF GAINS/(LOSSES)</u>		
10. Asset gain/(loss) (See Table 6)	\$	(2,769,486)
11. Salary/rank liability gain/(loss) for the period		(2,473,709)
12. Net liability gain/(loss) for the period ( 9. - 10. - 11.) #		(2,729,743)

## Change in Calculated Contribution

1. Calculated contribution in 2018 valuation		\$ 8,037,168
2. Benefit changes	0	
3. Assumption/method changes	2,502,118	
4. Change in Normal Cost^	(78,034)	
5. Investment experience	284,549	
6. Salary/rank experience	254,160	
7. Other liability experience #	420,201	
8. Total change	3,382,995	
9. Calculated contribution in 2019 valuation		\$ 11,420,163

\*Assume Normal Cost, contributions, and administrative expenses occurred in the mid-year.

^ The normal cost is a measure of the rate at which active member benefits are accruing and directly relates to the active member payroll. The reduction in normal cost is due to the reduction in active member payroll through terminations.

# Includes losses from less disabilities than expected.

## Table 3 – Actuarial Experience

	<u>2019</u>	<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>
1. Number of members										
a. Active	268	283	318	350	384	409	426	443	470	501
b. Retired	251	231	221	207	183	167	151	138	124	110
c. DROP	55	63	43	37	36	30	38	45	41	34
d. Beneficiaries	13	12	10	6	6	5	6	5	1	1
e. Terminated vested	15	17	19	14	13	17	16	14	18	18
f. Inactive	6	7	8	7	5	7	6	5	11	10
g. Total	608	613	619	621	627	635	643	650	665	674
2. Covered payroll	\$ 23,137,303	\$ 23,039,390	\$ 25,429,284	\$ 27,575,061	\$ 29,432,993	\$ 30,441,800	\$ 30,420,085	\$ 31,381,480	\$ 33,357,427	\$ 35,550,304
3. Average compensation	\$ 86,333	\$ 81,411	\$ 79,966	\$ 78,786	\$ 76,648	\$ 74,430	\$ 71,409	\$ 70,839	\$ 70,973	\$ 70,959
4. Valuation results										
a. Normal cost	\$ 5,264,460	\$ 4,733,647	\$ 5,001,850	\$ 5,463,111	\$ 5,767,089	\$ 5,959,768	\$ 5,976,371	\$ 6,319,141	\$ 6,218,536	\$ 6,661,663
b. Accrued liability	383,230,807	342,817,503	331,007,540	319,975,168	297,810,707	281,166,840	258,960,907	246,518,300	226,088,133	213,764,095
c. Actuarial value of assets	322,447,392	308,034,365	286,951,659	271,515,321	253,937,185	233,009,247	212,428,394	197,710,046	187,249,190	170,960,335
d. Unfunded liability	60,783,415	34,783,138	44,055,881	48,459,847	43,873,522	48,157,593	46,532,513	48,808,254	38,838,943	42,803,760
e. Remaining amortization	19	20	21	22	23	24	25	26	27	28
f. Funded ratio	84.1%	89.9%	86.7%	84.9%	85.3%	82.9%	82.0%	80.2%	82.8%	80.0%
5. Actuarially Determined contribution										
Estimated dollar contribution	\$ 11,420,163	\$ 8,037,168	\$ 9,479,498	\$ 10,368,391	\$ 9,645,675	\$ 10,203,704	\$ 9,986,634	\$ 10,605,836	\$ 9,619,134	\$ 10,256,567

Item 5 above is the calculated contribution as it is described throughout the report: normal cost plus the amortization of the UAAL under the policy as described in the current statutes.

There is a one-year lag. As an example, the contribution shown in valuation year 2018 is payable in fiscal year 2019.

## Table 4 – Reconciliation of Net Plan Assets

	Year Ending	
	December 31, 2018	December 31, 2017
1. Market value of assets at beginning of year	\$ 315,606,098	\$ 277,111,969
2. Revenue for the year		
a. Contributions		
i. Member contributions	\$ 2,222,616	\$ 2,319,332
ii. Employer contributions	7,590,899	8,433,311
iii. State contributions	0	0
iv. Contributions from the SWDD Plan	0	0
v. Total	\$ 9,813,515	\$ 10,752,643
b. Net investment income		
i. Interest	\$ 1,319,300	\$ 802,642
ii. Dividends	2,428,474	2,128,113
iii. Net change in accrued income	154,771	175,865
iv. Unrealized gain/(loss)	(18,181,495)	24,640,378
v. Realized gain/(loss)	15,329,432	13,352,012
vi. Defined contribution earnings (net)	(38,959)	(37,683)
vii. Investment expense	(2,792,945)	(2,833,765)
viii. Direct allocated plan	(14,045)	(5,769)
ix. Allocated fees and expenses	(131,849)	(116,685)
x. Other Income	1,776,554	2,513,893
c. Total revenue	\$ 9,662,753	\$ 51,371,644
3. Expenditures for the year		
a. Benefit payments	\$ (13,899,402)	\$ (12,859,508)
b. Refunds	0	(8,707)
c. Plan directed expenses	0	(9,300)
d. Total expenditures	(13,899,402)	(12,877,515)
4. Increase in net assets (2c. + 3d.)	\$ (4,236,649)	\$ 38,494,129
5. Market value of assets at end of year (1. + 4.)	\$ 311,369,449	\$ 315,606,098

## Table 5 – Development of Actuarial Value of Assets

1.	Actuarial value of assets at beginning of year	\$ 308,034,365
2.	Net new investments	
	a. Contributions	9,813,515
	b. Benefits paid	(13,899,402)
	c. Refunds	0
	d. Administrative Expenses	(145,894)
	e. Subtotal	(4,231,781)
3.	Assumed investment return rate for fiscal year	7.0%
4.	Assumed investment return for fiscal year	\$ 21,414,294
5.	Expected Actuarial Value at end of year	\$ 325,216,878
6.	Market value of assets at end of year	\$ 311,369,449
7.	Excess return (6-5)	\$ (13,847,429)
8.	Development of amounts to be recognized as of December 31, 2018:	

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)
2014	\$ 0	\$ 0	\$ 0	1	\$ 0	\$ 0
2015	0	0	0	2	0	0
2016	0	0	0	3	0	0
2017	7,471,733	(7,471,733)	0	4	0	0
2018	(21,319,162)	7,471,733	(13,847,429)	5	(2,769,486)	(11,077,943)
Total	\$ (13,847,429)	\$ 0	\$ (13,847,429)		\$ (2,769,486)	\$ (11,077,943)

9.	Actuarial value of assets as of December 31, 2018 (Item 6 - Item 8)	\$ 322,447,392
10.	Ratio of actuarial value to market value	103.6%

*Amounts in column (1) for fiscal years ending 2014 through 2017 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 2014 through 2017. To the extent possible, the 2017 excess or shortfall is used to reduce prior bases. In this case, the 2017 base is offset by the 2018 Shortfall. The fiscal year 2014 through 2016 bases are \$0 because they were previously offset.*

## Table 6 – Gain/(Loss) on Actuarial Value of Assets

	Year Ending	
	December 31, 2018	December 31, 2017
1. Actuarial assets as of January 1	\$ 308,034,365	\$ 286,951,659
2. Total contributions since prior valuation	\$ 9,813,515	\$ 10,752,643
3. Benefits, refunds, and administrative expenses since prior valuation	\$ (14,045,296)	\$ (12,999,969)
4. Assumed net investment income*		
a. Beginning assets	\$ 21,562,406	\$ 21,521,374
b. Contributions	343,473	403,224
c. Benefits, refunds, and administrative expenses	(491,585)	(487,499)
d. Total	\$ 21,414,294	\$ 21,437,099
5. Expected actuarial assets (1. + 2. + 3. + 4.)	\$ 325,216,878	\$ 306,141,432
6. Actual actuarial assets as of December 31	\$ 322,447,392	\$ 308,034,365
7. Net asset gain/(loss) since prior valuation (6. - 5.)	\$ (2,769,486)	\$ 1,892,933
	Loss	Gain

\*Based on 7.50% for fiscal year 2017 and 7.00% for fiscal year 2018.

## Table 7 – Statement of Funding Progress

Date	Actuarial Value of Assets (AVA)	Actuarial Accrued Liability (AAL)	Unfunded (Surplus) Actuarial		Annual Covered Payroll	UAAL as a % of payroll (4)/(6)
			Accrued Liability (UAAL (3) - (2))	Funded Ratio (2)/(3)		
(1)	(2)	(3)	(4)	(5)	(6)	(7)
January 1, 1998	\$ 63,082,332	\$ 45,567,059	\$ (17,515,273)	138.4 %	20,386,441	(85.9) %
January 1, 2000	86,139,093	72,268,663	(13,870,430)	119.2	22,905,603	(60.6)
January 1, 2002	97,169,645	91,016,905	(6,152,740)	106.8	29,154,383	(21.1)
January 1, 2004	105,649,541	117,092,862	11,443,321	90.2	33,432,961	34.2
January 1, 2005	117,965,939	122,896,108	4,930,169	96.0	34,437,864	14.3
January 1, 2006	137,688,853	139,568,165	1,879,312	98.7	39,294,072	4.8
January 1, 2007	159,508,243	161,530,980	2,022,737	98.7	40,438,034	5.0
January 1, 2008	178,548,095	188,263,199	9,715,104	94.8	39,048,754	24.9
January 1, 2009	156,099,012	198,695,916	42,596,904	78.6	36,735,114	116.0
January 1, 2010	170,960,335	213,764,095	42,803,760	80.0	35,550,304	120.4
January 1, 2011	187,249,190	226,088,133	38,838,943	82.8	33,357,427	116.4
January 1, 2012	197,710,046	246,518,300	48,808,254	80.2	31,381,480	155.5
January 1, 2013	212,428,394	258,960,907	46,532,513	82.0	30,420,085	153.0
January 1, 2014	233,009,247	281,166,840	48,157,593	82.9	30,441,800	158.2
January 1, 2015	253,937,185	297,810,707	43,873,522	85.3	29,432,993	149.1
January 1, 2016	271,515,321	319,975,168	48,459,847	84.9	27,575,061	175.7
January 1, 2017	286,951,659	331,007,540	44,055,881	86.7	25,429,284	173.2
January 1, 2018	308,034,365	342,817,503	34,783,138	89.9	23,039,390	151.0
January 1, 2019	322,447,392	383,230,807	60,783,415	84.1	23,137,303	262.7

**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 8 – Solvency Test

Valuation Date	Aggregated Accrued Liabilities for				Portion of Accrued Liabilities Covered by Reported Assets		
	Active Members Contributions	Retirees		Actuarial Value of Assets	by Reported Assets		
		Beneficiaries and Vested Terminations	Members (Employer Financed Portion)		(5)/(2)	[(5)-(2)]/(3)	[(5)-(2)-(3)]/(4)
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
January 1, 2007	\$ 25,345	\$ 45,637	\$ 90,549	\$ 159,508	100.0%	100.0%	97.8%
January 1, 2008	26,162	57,986	104,116	178,548	100.0%	100.0%	90.7%
January 1, 2009	26,693	70,017	101,986	156,099	100.0%	100.0%	58.2%
January 1, 2010	28,025	82,218	103,521	170,963	100.0%	100.0%	58.7%
January 1, 2011	28,721	96,564	100,804	187,249	100.0%	100.0%	61.5%
January 1, 2012	29,048	112,336	105,134	197,710	100.0%	100.0%	53.6%
January 1, 2013	30,326	118,304	110,331	212,428	100.0%	100.0%	57.8%
January 1, 2014	31,545	124,081	125,541	233,009	100.0%	100.0%	61.6%
January 1, 2015	31,514	139,420	126,876	253,937	100.0%	100.0%	65.4%
January 1, 2016	30,658	161,841	127,476	271,515	100.0%	100.0%	62.0%
January 1, 2017	29,768	179,910	121,329	286,952	100.0%	100.0%	63.7%
January 1, 2018	27,549	203,465	111,803	308,034	100.0%	100.0%	68.9%
January 1, 2019	27,998	224,234	130,999	322,447	100.0%	100.0%	53.6%

\$ amount in 000s

## Table 9 – Cash Flow Analysis

Year Ending December 31,	Contributions for the Year	Expenditures During the Year			Transfer to FPPA Statewide DB	External Cash Flow for the Year	Market Value of Assets	External Cash Flow as of Market
		Benefit Payments **	Expenses***	Total				
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
2004	\$ 6,156,684	\$ (2,820,944)	\$ (442,282)	\$ (3,263,226)	0	\$ 2,893,458	\$ 124,349,090	2.3 %
2005	6,841,155	(2,572,567)	(937,491)	(3,510,058)	0	3,331,097	140,611,634	2.4
2006	7,496,218	(2,952,333)	(1,056,148)	(4,008,481)	0	3,487,737	166,078,983	2.1
2007	8,173,010	(3,878,151)	(1,264,090)	(5,142,241)	(2,824,545)	206,224	182,745,963	0.1
2008	6,425,431	(4,757,098)	(1,322,660)	(6,079,758)	0	345,672	130,082,510	0.3
2009	8,216,628	(5,901,639)	(1,106,039)	(7,007,678)	0	1,208,950	158,403,521	0.8
2010	10,233,797	(6,219,750)	(1,272,055)	(7,491,805)	0	2,741,992	184,076,676	1.5
2011	9,666,399	(7,351,231)	(1,471,682)	(8,822,913)	(1,127,899)	(284,412)	186,028,008	(0.2)
2012	8,974,225	(7,901,852)	(1,799,573)	(9,701,425)	0	(727,200)	208,760,917	(0.3)
2013	10,647,439	(8,493,950)	(2,024,231)	(10,518,181)	0	129,258	242,667,157	0.1
2014	10,559,461	(9,260,894)	(2,147,681)	(11,408,575)	0	(849,114)	260,252,124	(0.3)
2015	10,409,669	(10,187,956)	(412,381)	(10,600,337)	0	(190,668)	264,726,596	(0.1)
2016	10,140,632	(11,658,008)	(451,871)	(12,109,879)	0	(1,969,247)	277,111,969	(0.7)
2017	10,752,643	(12,868,215)	(131,754)	(12,999,969)	0	(2,247,326)	315,606,098	(0.7)
2018	9,813,515	(13,899,402)	(145,894)	(14,045,296)	0	(4,231,781)	311,369,449	(1.4)
2019*	8,037,168	(14,982,169)	(149,541)	(15,131,710)	0	(7,094,542)	325,822,460	(2.2)
2020*	11,420,163	(16,300,843)	(153,280)	(16,454,123)	0	(5,033,960)	343,419,883	(1.5)

\* Cash flow estimated based on expected contributions and expected benefit payments. Assets are assumed to increase at the annual return of 7.5% with all cash flow occurring in the middle of the year.

\*\* Expected Benefit Payments for 2019 and beyond include expected retirements, expected mortality and if applicable, future cost of living increases.

\*\*\* Beginning in fiscal year ending December 31, 2015, expenses reflect administrative expense only. Prior years include investment expenses.

## Table 10 – Membership Data

	January 1, 2019	January 1, 2018	January 1, 2017
1. Active members			
a. Number	268	283	318
b. Total payroll	\$ 23,137,303	\$ 23,039,390	\$ 25,429,284
c. Average annual salary	\$ 86,333	\$ 81,411	\$ 79,966
d. Average age	47.4	46.6	46.2
e. Average service	19.3	18.4	18.0
2. Terminated vested members			
a. Number	15	17	19
b. Total annual benefits	\$ 426,008	\$ 464,868	\$ 344,240
c. Average annual benefit	\$ 28,401	\$ 27,345	\$ 18,118
d. Average age	45	44	45
3. Members In DROP			
a. Number	55	63	43
b. Total annual benefits	\$ 3,280,758	\$ 3,647,654	\$ 2,500,058
c. Average annual benefit	\$ 59,650	\$ 57,899	\$ 58,141
d. Average age	56	55	55
4. Service retirees			
a. Number	251	231	221
b. Total annual benefits	\$ 10,652,915	\$ 9,529,528	\$ 9,138,461
c. Average annual benefit	\$ 42,442	\$ 41,253	\$ 41,351
d. Average age	62	62	61
5. Beneficiaries			
a. Number	13	12	10
b. Total annual benefits	\$ 280,267	\$ 253,673	\$ 179,636
c. Average annual benefit	\$ 21,559	\$ 21,139	\$ 17,964
d. Average age	63	61	60
6. Inactive members			
a. Number	6	7	8

## Table 11 – Summary of Retirees by Age and Type

Age	Retirees		Disabled Members		Beneficiaries		Members in DROP		All	
	Number	Average	Number	Average	Number	Average	Number	Average	Number	Average
		Monthly Pension		Monthly Pension		Monthly Pension		Monthly Pension		Monthly Pension
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)
Less than 50	2	\$ 3,225	0	\$ 0	2	\$ 2,374	0	\$ 0	4	\$ 2,800
50-54	29	2,735	0	0	0	0	21	4,730	50	3,573
55-59	53	3,322	0	0	2	2,829	29	5,159	84	3,944
60-64	82	3,973	0	0	0	0	4	4,406	86	3,993
65-69	52	3,626	0	0	3	1,592	1	6,823	56	3,574
70-74	32	3,356	0	0	3	1,577	0	0	35	0
75-79	1	4,235	0	0	3	1,939	0	0	4	0
Greater than 80	0	0	0	0	0	0	0	0	0	0
All	251	3,537	0	0	13	1,797	55	4,971	319	3,713

**Table 12 – Schedule of Retirants & Annuitants Added to and Removed from Rolls**

Valuation Year (1)	Added to Rolls		Removed from Rolls		Rolls-End of Year		% Increase in Annual Benefits (8)	Average Annual Benefits (9)	Average Age (10)
	Number (2)	Annual Benefits* (3)	Number (4)	Annual Benefits (5)	Number (6)	Annual Benefits (7)			
2006	12	\$ 443,028	0	\$ 0	78	\$ 2,376,300	22.9 %	\$ 30,465	55.0
2007	14	619,230	0	0	92	2,995,530	26.1	32,560	55.4
2008	21	897,046	0	0	113	3,892,576	29.9	34,448	54.5
2009	17	847,350	0	0	130	4,739,926	21.8	36,461	55.5
2010	16	791,367	1	14,525	145	5,516,768	16.4	38,047	56.0
2011	21	1,007,007	0	0	166	6,523,775	18.3	39,300	57.8
2012	25	1,044,739	3	97,040	188	7,471,474	14.5	39,742	58.2
2013	9	428,295	2	73,884	195	7,825,885	4.7	40,133	59.1
2014	9	460,165	2	75,382	202	8,210,668	4.9	40,647	59.8
2015	24	1,230,728	1	22,383	225	9,419,013	14.7	41,862	59.8
2016	26	1,266,408	1	32,035	250	10,653,386	13.1	42,614	59.8
2017	27	1,251,164	3	86,395	274	11,818,155	10.9	43,132	60.3
2018	34	1,715,802	2	103,102	306	13,430,855	13.6	43,892	60.3
2019	14	813,587	1	30,501	319	14,213,941	5.8	44,558	61.5

\* Includes cost-of-living adjustments granted since the prior valuation.



c) Pre-Retirement Mortality

2006 central rates from the RP-2014 Employee Mortality Tables for males and females projected to 2018 using the MP-2017 projection scales, and then projected prospectively using the ultimate rates of the scale for all years, 50% multiplier for off-duty mortality. Increased by 0.00015 for on-duty experience.

Annual Rate per 1,000 Members

Attained

Age in 2019 (1)	Males (2)	Females (3)
20	0.34	0.23
25	0.40	0.24
30	0.40	0.27
35	0.45	0.31
40	0.50	0.38
45	0.65	0.49
50	0.99	0.69
55	1.56	1.04

d) Withdrawal (any reason other than retirement, death, or disability) rates at selected ages are shown:

Annual Rate per 1,000 Members

<u>Years of Service</u>	<u>Termination Rates</u>	<u>Years of Service</u>	<u>Termination Rates</u>
0	108.4	12	14.6
1	93.1	13	12.9
2	79.5	14	11.8
3	67.5	15	10.9
4	57.1	16	10.3
5	48.0	17	10.0
6	40.2	18	9.7
7	33.6	19	9.4
8	28.1	20	8.9
9	23.4	21	8.3
10	19.7	22	7.2
11	16.8	23	5.7

### 3. Post-Retirement Mortality

Healthy Retirees, Beneficiaries

2006 central rates from the RP-2014 Annuitant Mortality Tables for males and females projected to 2018 using the MP-2017 projection scales, and then projected prospectively using the ultimate rates of the scale for all years.

<u>Annual Rate per 1,000 Members</u>		
Attained		
Age in 2019	Males	Females
(1)	(2)	(3)
50	4.05	2.73
55	5.80	3.83
60	8.13	5.73
65	11.65	8.44
70	17.27	13.03
75	27.58	21.40
80	46.58	36.63
85	81.60	65.45

### 4. Salary Increase Rate

A service-related component shown below, plus a 2.5% inflation component and 1.75% productivity component, as follows:

<u>Years of Service</u>	<u>Service-Related Component</u>	<u>Total Annual Rate of Increase</u>
		<u>Including 2.5% Inflation and 1.75% Productivity Component</u>
1	7.00%	11.25%
2	7.00%	11.25%
3	6.50%	10.75%
4	6.00%	10.25%
5	3.50%	7.75%
6	1.50%	5.75%
7	1.50%	5.75%
8	1.00%	5.25%
9	0.75%	5.25%
10	0.75%	5.00%
11	0.75%	5.00%
12	0.50%	4.75%
13	0.50%	4.75%
14	0.25%	4.50%
15	0.00%	4.25%



Salary increases are assumed to occur once a year, on January 1st. 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.

5. Marital Status

- a) Percent married 85% male and female
- b) Age difference Males are assumed to be two years older than females.

6. Benefit Escalation 2.6%

7. Payroll Growth 0.00% - The plan is closed to New Entrants. Therefore, no payroll growth was assumed in the amortization calculation.

8. Third Week Pay Impact To account for third week pay, an additional salary increase of 0.5% is included after 10 years of service and another 0.5% after 20 years of service. In addition, final average pay is increased by 2% at the time of retirement. This approximates 25% of actives beginning to cash out third week pay in their 11<sup>th</sup> year of service, 25% beginning to cash out third week pay in their 21st year of service, and 50% of actives not cashing out until their last 78 months of employment (and then cashing out twice during that time).

9. Administrative Expense An explicit administrative expense equal to the prior year actual expenses

10. Changes in Actuarial Assumptions

Since the prior valuation, the Board adopted new assumptions based on the 2018 Experience Study. The changes from the prior assumptions set are summarized below:

1. Reduce the real return from 5.0% to 4.50% to reflect reduced real return expectations. Combined with an unchanged inflation rate of 2.50%, reduce the nominal investment assumption from 7.50% to 7.00%.
2. Increase the productivity component of the salary scale assumption from 1.50% to 1.75%. Combined with the inflation rate of 2.50%, this creates an ultimate salary scale assumption of 4.25%. In accordance with the observed experience, slightly lower the service-based promotional/longevity component of the salary scale.
3. Remove the blue-collar adjustment from the mortality tables being used and update the mortality projection scale from Scale BB to the ultimate rates of the MP-2017 projection scale.
4. Increase disability rates for members covered by a defined benefit program.
5. Slightly modify retirement rates to reflect increased retirement utilization for low service members and slightly decreased normal retirement rates after age 55.

## 11. Actuarial Cost Method

Under the entry age actuarial cost method, the normal cost is computed as the level percent of pay, which, if paid from the earliest time each member would have been eligible to join the plan if it then existed (thus, entry age) until his retirement or termination, would accumulate with interest at the rate assumed in the valuation to a fund sufficient to pay all benefits under the plan. The normal cost for the plan is determined by summing the normal cost of all members.

The actuarial accrued liability under this method at any point in time is the theoretical amount of the fund that should have been accumulated had annual contributions been made in prior years equaling to the normal cost. The unfunded actuarial accrued liability/(surplus) is the excess of the actuarial accrued liability over the actuarial value of the plan assets as of the valuation date.

The contribution requirements determined by this valuation will not be effective until one year later, and the determination of the requirement reflects this deferral. It is assumed that there will be no change in the normal cost due to the deferral, and it is assumed that payments are made monthly throughout the year. The reflection of the one year lag and the timing of the contributions are changes from the methodology of prior valuations.

Under this method, experience gains and losses (i.e. decreases or increases in accrued liabilities), attributable to deviations in experience from the actuarial assumptions, adjust the unfunded actuarial accrued liability.

## 12. Asset Valuation Method

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.

## Table 14 – Summary of Benefit Provisions

### Plan Description

Two plans from the City of Colorado Springs joined the Fire & Police Pension Association Defined Benefit System as of October 1, 2006. They are now one single-employer defined benefit pension plan, Colorado Springs New Hire Pension Plan (“Plan”), but with a fire component and a police component for fire and police employees hired by the City of Colorado Springs on or after April 8, 1978 but prior to October 1, 2006. The plans are closed to new members as of October 1, 2006.

Employers may not withdraw from the Fire & Police Pension Association Defined Benefit System once elected. The Plan members had opportunities to transfer to the Fire & Police Pension Association Defined Benefit System - Statewide Defined Benefit Plan in conjunction with the administrative change. The Plan assets are included in the Fire & Police Members’ Benefit Investment Fund and the Fire & Police Members’ Self-Directed Investment Fund (for Deferred Retirement Option Plan “DROP” assets and Separate Retirement Account assets from eligible retired members).

### Plan Year

A twelve-month period ending December 31.

### Members Included

Members included are active employees hired on or after April 8, 1978 but prior to October 1, 2006. As of October 1, 2006, administration of the plan has been transferred to the Fire & Police Pension Association and the plan has been closed. All members hired on or after October 1, 2006 will become members of the Fire & Police Pension Association Defined Benefit System - Statewide Defined Benefit Plan.

### Compensation Considered

Basic salary, including longevity pay, sick pay taken in the normal course of employment, vacation leave pay taken in the normal course of employment, third-week pay and mandatory overtime (including Annual Pay in lieu of leave) that is part of the members annual fixed periodic compensation. Also, all salary amounts deferred for 457 or Section 125 “cafeteria plan” are included.

### **Contribution Rates**

The Plan sets contribution rates at a level that enables all benefits to be fully funded at the retirement date of all members within each component as determined by the actuarial study. Effective January 1, 2018, the Police Component's actuarially determined contribution was \$9,479,498. Of this amount the members of the Plan contributed 8 percent of basic salary and the employer remitted the remainder. Effective January 1, 2019, the actuarially determined contribution is \$8,037,168.

### **Final Average Salary**

Final Average Salary is the average of monthly basic salary compensation awarded to the member during the 18 months immediately preceding termination or retirement.

### **Normal Retirement Date**

A member's Normal Retirement Date shall be the date on which the member has completed at least 25 full years of credited service and has attained age 50.

### **Normal Retirement Benefit**

Any member who elects to retire on or after his Normal Retirement Date shall be eligible for a monthly pension equal to 2 percent of Final Average Salary for each full year of service for the first 10 years, plus 2.75 percent of Final Average Salary for each full year of service in excess of 10 years. The maximum monthly pension is 75 percent of Final Average Salary. The maximum pension is earned upon completing 30 years of service.

### **Early Retirement Benefit**

A member under the Police Component who has a minimum of 20 years of service is eligible to receive a reduced, early retirement pension benefit beginning at age 45. The early retirement pension benefit shall be equal to 2 percent of Final Average Salary for each full year of service for the first 10 years, plus 2.75 percent for each full year of service thereafter, not to exceed the maximum monthly pension benefit of 75 percent, reduced by 7.5 percent for each year and portion thereof that the benefit commences prior to age 50.

Any member hired prior to May 1, 2001, who has completed at least 20 years of service and who has attained the age of 45 years may elect to retire from active service but shall receive 50 percent of the member's Final Average Salary, with that amount reduced by 0.5 percent for each month or portion thereof that such member lacks to attain the age of 50 years as of the date of retirement.

Any member hired after April 30, 2001, and before October 1, 2003, who has completed at least 20 years of service prior to attaining the age of 45 years may elect to retire from active service shall receive 50 percent of the member's Final Average Salary, with that amount reduced by 0.5 percent for each month or portion thereof that such member lacks to attain the age of 50 years as of the date of retirement.

### **Deferred Retirement Benefit**

Any member retiring and eligible for a Normal Retirement Benefit may elect to defer receipt of such pension until attaining the age of 65 years. In the case of such an election, the annual deferred retirement pension shall be actuarially equivalent to the normal retirement pension.

### **Terminated Vested Benefit**

A member who terminates with at least 10 years of active service may leave the contributions in the Plan and when the member attains age 50 be eligible to receive a monthly vested benefit equal to 2 percent of Final Average Salary for each full year of credited service for the first 10 years, plus 2.75 percent of Final Average Salary for each full year of credited service in excess of 10 years. The maximum benefit is 75 percent of Final Average Salary.

### **Severance Benefit**

In lieu of a future pension, a member may, upon termination elect to have the accumulated member contributions refunded in a lump sum. Interest is credited at 5 percent per annum.

### **Death & Disability Benefit of Active Members**

Disabled members and survivors (spouse or dependent children) of active members who die prior to retirement eligibility are covered by the benefits provided by the Fire & Police Pension Association Statewide Death & Disability Plan.

### **Post-Retirement Death Benefit**

If a retired member dies, the "qualified surviving spouse" shall receive, until death, a monthly pension equal to 70 percent of the monthly benefit the member was receiving prior to death, including cost-of-living increases. If there is no "qualified surviving spouse" or if the qualified surviving spouse dies, each qualified surviving child should receive equal shares of the qualified surviving spouses benefit, as long as the child remains a "qualified child." For purposes of this Plan, a spouse includes a partner in a civil union.

### **Cost-of-Living Adjustment (COLA)**

Benefits are increased to reflect increases in the consumer price index but in no case may benefits be increased by more than 3 percent for any one year. Cost-of-living adjustments begin on

October 1 immediately prior to the earlier of attainment of age 60 or 10 years after benefit payments commenced.

### **Deferred Retirement Option Plan (DROP)**

A member may elect to participate in the DROP after reaching eligibility for Normal Retirement. A member continues to work while participating in the DROP, but must terminate employment within five years of entry into the DROP. The member's percentage of retirement benefit is frozen at the time of entry into the DROP. The monthly payments that begin at entry into the DROP are accumulated until the member terminates service, at which time the DROP accumulated benefits can be paid as a lump sum, if desired. The member continues contributing the member contribution rate which is credited to the DROP. Effective March 1, 2003, the member shall self-direct the investments of their DROP funds.

### **Purchase of Service Credit**

Active members of this Plan may purchase service credit for other employment completed within the United States not covered by this Plan. The cost of such service credit purchase shall be determined by the Fire & Police Pension Association Board of Directors and shall be on an actuarially equivalent basis. A member shall not be allowed to purchase service credit to the extent that the additional accrued benefits derived from the purchased service credit would result in the annual amount of the member's benefit exceeding the annual benefit limitation for defined benefit plans as determined under section 415 of the Internal Revenue Code (Ord. 02-114).

### **Stabilization Reserve Account (SRA)**

Annually, at the discretion of the Fire & Police Pension Association Board of Directors, a contribution may be allocated to the SRA based on the actuarial study for the previous year. Amounts set aside in the SRA are allocated to individual accounts for each member. A member may receive the amount in this individual account upon election of normal, early, vested, disability, deferred retirement, or in the event of the active member's death. If the cost of the defined benefit plan exceeds the combined member/employer contribution rate, funds from the SRA may be used to make up the shortfall. Effective January 1, 2008, the Separate Retirement Account contribution rate for members of the Police Component was set at 0 percent. The rate will remain at 0 percent for calendar years 2018 and 2019.

## Table 15 – Definition of Terms

1. Actuarial Cost Method  
A method for determining the actuarial present value of future benefits and allocating such value to time periods in the form of a normal cost and an actuarial accrued liability.
2. Present Value of Future Benefits  
This is computed by projecting the total future benefit cash flow from the Plan, using actuarial assumptions, and then discounting the cash flow to the valuation date.
3. Normal Cost  
Computed differently under different actuarial cost methods, the normal cost generally represents the value of the portion of the participant's anticipated retirement, termination, and/or death and disability benefits accrued during a year.
4. Actuarial Accrued Liability  
Computed differently under different actuarial cost methods. Generally actuarial accrued liability represents the value of the portion of the participant's anticipated retirement, termination, and/or death and disability benefits accrued as of the valuation date.
5. Entry Age Actuarial Cost Method  
A method under which a participant's actuarial present value of future benefits is allocated on a level basis over the earnings of the participant between his/her entry into the Plan and his/her assumed exit.
6. Unfunded Actuarial Accrued Liability  
The difference between total actuarial present value of future benefits over the sum of the tangible assets of the Plan and the actuarial present value of the members' future normal costs. The Plan is underfunded if the difference is positive and overfunded if the difference is negative.
7. Actuarial Value of Assets  
The value of cash, investments, and other property belonging to the Plan, as valued by the actuary for purposes of the actuarial valuation.

8. Actuarial Gain or Loss

From one valuation to the next, if the experience of the plan differs from that anticipated by the actuarial assumptions, an actuarial gain or loss occurs. For example, an actuarial gain would occur if the assets in the trust had a yield of 12% based on actuarial value, while the assumed yield on the actuarial value of assets was 7.5%.



## Table 16 - Supplemental Studies

A. 5-year Deterministic Projection

Because the Plan is closed to new members, the amortization policy was changed to be level dollar effective January 1, 2008. As the payroll for the closed group diminishes, it is expected that the normal cost for the group will decrease over time. The amortization payment increases over the five-year projection period as the outstanding asset losses of \$11.1 million are recognized.

The following exhibit provides an illustration of how the current valuation would expect the contribution amount to change over the next few valuations if all actuarial assumptions are met.

Year	Amortization Cost for UAAL	Normal Cost	Administrative Expenses	Total Contribution
2020	\$ 6,009,809	\$ 5,264,460	\$ 145,894	\$ 11,420,163
2021	6,330,019	5,100,200	141,362	11,571,581
2022	6,673,282	4,806,404	133,373	11,613,059
2023	7,038,394	4,484,018	124,612	11,647,024
2024	7,423,735	4,155,436	115,570	11,694,741

## Table 17 – Risks Associated with Measuring the Accrued Liability and Actuarially Determined Contribution

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

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

1. Investment risk – actual investment returns may differ from the expected returns;
2. Asset/Liability mismatch – changes in asset values may not match changes in liabilities, thereby altering the gap between the accrued liability and assets and consequently altering the funded status and contribution requirements;
3. Contribution risk – actual contributions may differ from expected future contributions. For example, actual contributions may not be made in accordance with the plan's funding policy;
4. Longevity risk – members may live longer or shorter than expected and receive pensions for a period of time other than assumed;

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

The computed contribution rate shown on page 5 may be considered as a minimum contribution rate that complies with the Plan's funding policy. The timely receipt of the actuarially determined contributions is critical to support the financial health of the plan. Users of this report should be aware that contributions made at the actuarially determined rate do not necessarily guarantee benefit security.

## Plan Maturity Measures

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

	<u>January 1, 2019</u>	<u>January 1, 2018</u>
Ratio of actives to retirees and beneficiaries	0.8	0.9
Ratio of net cash flows to market value of assets	-1.4%	-0.7%
Duration of the present value of future benefits	14.6	14.5

### Ratio of Actives to Retirees and Beneficiaries

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

### Ratio of net Cash Flow to Market Value of Assets

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

### Duration of Actuarial Accrued Liability

The duration of the actuarial accrued liability may be used to approximate the sensitivity to a 1% change in the assumed rate of return. For example, duration of 10 indicates that the liability would increase approximately 10% if the assumed rate of return were lowered 1%.

### Additional Risk Assessment

Additional risk assessment is outside the scope of the annual actuarial valuation. Additional assessment may include scenario tests, sensitivity tests, stochastic modeling, stress tests, and a comparison of the present value of accrued benefits at low-risk discount rates with the actuarial accrued liability