El Paso County Retirement Plan

Actuarial Valuation Report

As of January 1, 2019

July 2019

July 19, 2019

Board of Retirement
El Paso County Retirement Plan
2880 International Circle, Suite N030
Colorado Springs, CO 80910

Re: Certification of January 1, 2019 Actuarial Valuation

Ladies and Gentlemen:

This report summarizes the results of the actuarial valuation of the El Paso County Retirement Plan (Plan) as of January 1, 2019 performed by Buck Global, LLC (Buck).

The actuarial valuation is based on draft assets as of December 31, 2018 and member data provided by the Retirement Plan Administrator and summarized in this report. The benefits considered are those delineated in the Plan as amended and restated effective January 1, 2013.

All costs, liabilities and other factors under the Plan were determined in accordance with applicable Actuarial Standards of Practice[1]. An actuarial cost method which we believe is reasonable is used to measure the actuarial liabilities as of the valuation date. This report fully and fairly discloses the actuarial position of the Plan as of January 1, 2019.

Where presented, references to “funded ratio” and “unfunded actuarial accrued liability” are measured on an actuarial value of assets basis. It should be noted that the same measurements using market value of assets would result in different funded ratios and unfunded actuarial accrued liabilities. Moreover, the funded ratio presented is appropriate for evaluating the need and level of future contributions but makes no assessment regarding the funded status of the Plan if the Plan were to settle (i.e. purchase annuities) for a portion or all of its liabilities.

The actuarial assumptions used in the January 1, 2019 actuarial valuation are based on the results of an actuarial experience study for the period January 1, 2013 to December 31, 2017, which resulted in changes in actuarial assumptions adopted by the El Paso County Retirement Board in October 2018 to better reflect expected future experience. In our opinion, the actuarial assumptions used are reasonable, taking into account the experience of the Plan and reasonable long-term expectations, and represent the best estimate of the anticipated long-term experience under the Plan. A summary of the actuarial assumptions and methods used in this actuarial valuation is shown in Section 4.3.

Currently, participating employers and members each contribute 8.0% of pay. The total contribution of 16.0% of pay is less than the actuarially determined contribution (which is 18.3% of

[1] See Section 4.4 for a discussion of risk factors under Actuarial Standard of Practice No. 51.

pay for 2019). If actual contributions remain less than the actuarially determined contributions, the funded status is expected to decrease and contribution requirements are expected to increase over time.

The Board and staff may use this report for the review of the operations of the Plan. Use of this report for any other purposes or by anyone other than the Board members and staff may not be appropriate and may result in mistaken conclusions because of failure to understand applicable assumptions, methods, or inapplicability of this report for that purpose. Because of the risk of misinterpretation of actuarial results, you should ask Buck to review any statement you wish to make regarding the results contained in this report. Buck will not accept any liability for any such statement made without prior review by Buck.

Future actuarial measurements may differ significantly from current measurements due to Plan experience differing from that anticipated by the economic and demographic assumptions, increases or decreases expected as part of the natural operation of the methodology used for these measurements, and changes in Plan provisions or applicable law. An analysis of the potential range of such differences is beyond the scope of this valuation.

This report was prepared under our supervision and in accordance with all applicable Actuarial Standards of Practice. We are Fellows of the Society of Actuaries, Enrolled Actuaries, and Members of the American Academy of Actuaries. We meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinions contained herein.

We are available to discuss this report with you at your convenience. David can be reached at 602-803-6174 and Amy can be reached at 713-429-9741 to answer questions about this report.

Respectfully submitted,

Buck Global, LLC (Buck)

David J. Kershner, FSA, EA, MAAA, FCA
Principal

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Director

Table of Contents

Purpose and Highlights 1

Summary of Principal Valuation Results 2

Effects of Changes 3

Section 1: Funding Results 4
- Section 1.1 Comparative Summary of Principal Valuation Results 5
- Section 1.2 Actuarially Required Contribution 7
- Section 1.3 Actuarial Gain / (Loss) 8
- Section 1.4 Normal Cost and Unfunded Actuarial Accrued Liability 9
- Section 1.5 Present Value of Projected Plan Benefits 10
- Section 1.6 Ten-Year Projected Cash Flow 11

Section 2: Accounting Results (GASB 25) 12
- Section 2.1 Historical Exhibits 12

Section 3: Plan Assets 14
- Section 3.1 Summary of Assets 15
- Section 3.2 Reconciliation of Assets 16
- Section 3.3 Actuarial Value of Assets 17
- Section 3.4 Average Annual Rates of Investment Return 18

Section 4: Basis of Valuation 19
- Section 4.1 Plan Participants 20
- Section 4.2 Summary of Plan Provisions 26
- Section 4.3 Summary of Actuarial Methods, Procedures and Assumptions 29
- Section 4.4 ASOP 51 Risk Discussion 33

Glossary of Terms 35

Purpose and Highlights

The main purposes of the actuarial valuation detailed in this report are:

1. To determine if the Board's funding policy for the Plan is being met considering current assets and liabilities, and the current employer and member contribution rates;
2. To review the current funded status of the Plan; and
3. To compare actual and expected experience under the Plan during the prior year.

The January 1, 2019 actuarial valuation is based on the current plan provisions which are described in Section 4.2, and the actuarial methods and assumptions which are described in Section 4.3. There were no changes in plan provisions since the last valuation. The actuarial assumptions and the amortization method were updated based on an experience study performed for the period January 1, 2013 to December 31, 2017, as adopted by the Board in October 2018.

Highlights from the current and prior valuations are:

1. A contribution rate of 8.0% of salary by both the participating employers and members (16% of salary in total) in 2019 will not be sufficient to meet the Board's funding policy of paying the normal cost and amortizing the unfunded actuarial accrued liability over 30 years from the valuation date[1]. The total actuarially required contribution necessary to fund the Plan's benefits under the Board's funding policy for 2019 is 18.3% of salary, resulting in a contribution shortfall in 2019 of approximately $3.6 million
2. Actuarial losses of $9,499,065 were experienced in 2018 from asset sources, and actuarial losses of $4,750,988 were experienced in 2018 from liability sources. These losses combined to increase the unfunded actuarial accrued liability as of January 1, 2019 by $14,250,053.

   The net loss from liability sources was primarily due to new entrants, early retirement experience, and service purchases, partially offset by less-than-expected salary increases.
3. The funded ratio based on Actuarial Value of Assets is 66.2% (vs. 71.2% in 2018). The funded ratio based on Market Value of Assets is 61.8% (vs. 72.2% in 2018). The approximate rate of return on Actuarial Value of Assets in 2018 was 5.4%; the approximate rate of return on Market Value of Assets in 2018 was (2.7%).
4. The new assumptions adopted by the Board in October 2018 based on the experience study for the period January 1, 2013 to December 31, 2017 increased the Actuarial Accrued Liability as of January 1, 2019 by $27,443,622. The new Unfunded Actuarial Accrued Liability amortization method (25-year layering) does not impact the amortization amount in 2019, but will impact the amortization amounts in future years.

[1] Changes in Unfunded Actuarial Accrued Liability after January 1, 2019 will be amortized over closed 25-year periods.

Summary of Principal Valuation Results

A summary of principal valuation results from the current valuation and the prior valuation follows. Any changes in actuarial assumptions, methods or plan provisions between the two valuations are described in the section titled "Effects of Changes."

	Actuarial Valuation as of		Change Between Years	
	January 1, 2018	January 1, 2019	Amount	Percent
Summary of Costs				
Actuarial Contribution Requirement	$ 24,566,860	$ 29,011,694	$ 4,444,834	18.1%
Estimated Contributions	$ 24,201,316	$ 25,394,322	$ 1,193,006	4.9%
Actuarial Contribution Requirement as a Percentage of Pay	16.2%	18.3%	2.1%	13.0%
Funded Status				
Actuarial Accrued Liability	$ 531,589,132	$ 582,997,691	$ 51,408,559	9.7%
Actuarial Value of Assets	$ 378,292,120	$ 385,753,041	$ 7,460,921	2.0%
Unfunded Actuarial Accrued Liability/(Surplus)	$ 153,297,012	$ 197,244,650	$ 43,947,638	28.7%
Market Value of Assets and Additional Liabilities				
Market Value of Assets	$ 383,591,448	$ 360,483,046	$ (23,108,402)	(6.0%)
Present Value of Projected Plan Benefits	$ 633,801,303	$ 700,569,693	$ 66,768,390	10.5%
Summary of Data				
Number of Members in Valuation:				
Active Members	2,693[1]	2,791[2]	98	3.6%
Members with Deferred Benefits	458	474	16	3.5%
Retired Members	1,521	1,616	95	6.2%
Beneficiaries	109	118	9	8.3%
Total	4,781	4,999	218	4.6%
Active Member Statistics				
Total Annual Compensation	$ 153,027,339[1]	$ 161,000,191[2]	$ 7,972,852	5.2%
Average Compensation	$ 56,852[3]	$ 57,700[4]	$ 848	1.5%
Average Age	44.2[3]	43.7[4]	(0.5)	(1.1%)
Average Service	7.8[3]	7.3[4]	(0.5)	(6.4%)

[1] Includes 30 members on leave of absence.
[2] Includes 36 members on leave of absence.
[3] Excludes 30 members on leave of absence.
[4] Excludes 36 members on leave of absence.

Effects of Changes

Changes in Actuarial Assumptions

The assumptions adopted by the Board as part of the recent experience study increased the January 1, 2019 actuarial accrued liability by $27.4 million.

Changes in Plan Provisions

There were no changes in plan provisions since the prior valuation.

Changes in Actuarial Methods

The change in the amortization method adopted by the Board as part of the recent experience study had no effect on the actuarially determined contribution for 2019, but will impact the actuarially determined contribution in future years.

Section 1: Funding Results

Section 1.1 A comparative summary of valuation results.

Section 1.2 The actuarially required contribution.

Section 1.3 The actuarial gain/(loss) during the preceding year.

Section 1.4 The normal cost and unfunded actuarial accrued liability as of the current and prior valuation dates.

Section 1.5 The present value of projected plan benefits.

Section 1.6 A ten-year projection of retirement benefit payments.

Section 1.1: Comparative Summary of Principal Valuation Results

		Actuarial Valuation as of January 1, 2018	Actuarial Valuation as of January 1, 2019	Percent Change
A.	**Summary of Data**			
1.	Active Members			
	a. Number[1]	2,693	2,791	3.6%
	b. Annual Compensation[1]	$ 153,027,339	$ 161,000,191	5.2%
	c. Average Annual Compensation[2]	$ 56,852	$ 57,700	1.5%
	d. Average Age[2]	44.2	43.7	(1.1%)
	e. Average Service[2]	7.8	7.3	(6.4%)
	f. Accumulated Member Contributions[2]			
	i. With Interest	$ 86,071,897	$ 86,692,096	0.7%
	ii. Without Interest	$ 69,896,199	$ 70,979,620	1.6%
2.	Refund of Employee Contributions due			
	a. Number	128	133	3.9%
	b. Amount of Refunds Due	$ 783,826	$ 637,652	(18.6%)
3.	Vested Terminated Members			
	a. Number[3]	330	341	3.3%
	b. Annual Deferred Benefits	$ 2,944,123	$ 3,106,406	5.5%
	c. Average Annual Deferred Benefit	$ 8,922	$ 9,110	2.1%
4.	Retired and Disabled Members			
	a. Number	1,521	1,616	6.2%
	b. Annual Retirement Benefits	$ 28,726,486	$ 31,343,008	9.1%
	c. Average Annual Retirement Benefit	$ 18,887	$ 19,395	2.7%
5.	Beneficiaries			
	a. Number	109	118	8.3%
	b. Annual Retirement Benefits	$ 1,309,070	$ 1,446,857	10.5%
	c. Average Annual Retirement Benefit	$ 12,010	$ 12,262	2.1%
6.	Total Members Included in Valuation	**4,781**	**4,999**	**4.6%**

[1] Includes 30 members on leave of absence in 2018, and 36 members on leave of absence in 2019.

[2] Excludes 30 members on leave of absence in 2018, and 36 members on leave of absence in 2019.

[3] Includes 12 deferred disableds and 4 deferred beneficiaries in 2018, and 12 deferred disableds and 3 deferred beneficiaries in 2019.

Section 1.1: Comparative Summary of Principal Valuation Results (continued)

	Actuarial Valuation as of January 1, 2018		Actuarial Valuation as of January 1, 2019		Percent Change
B. Summary of Assets, Liabilities and Funded Status					
1. Plan Assets on Valuation Date					
a. Actuarial Value	$	378,292,120	$	385,753,041	2.0%
b. Market Value	$	383,591,448	$	360,483,046	(6.0%)
2. Actuarial Accrued Liability	$	531,589,132	$	582,997,691	9.7%
a. Funded Ratio - Actuarial Value		71.2%		66.2%	(7.0%)
b. Funded Ratio - Market Value		72.2%		61.8%	(14.4%)
c. Vested Funded Ratio – Market Value[1]		74.6%		64.7%	(13.3%)
3. Unfunded Actuarial Accrued Liability (Based on Actuarial Value of Assets)	$	153,297,012	$	197,244,650	28.7%
4. Present Value of Projected Benefits	$	633,801,303	$	700,569,693	10.5%

	Actuarial Valuation as of January 1, 2018			Actuarial Valuation as of January 1, 2019			Percent Change in Amount
		Amount	% of Comp.		Amount	% of Comp.	
C. Summary of Contribution Requirements							
1. Normal Cost Compensation	$	151,258,230	N/A	$	158,714,516	N/A	4.9%
2. Total Normal Cost Beginning of Year	$	14,603,164	9.65%	$	16,249,590	10.24%	11.3%
3. Amortization of Unfunded Actuarial Accrued Liability over 30 years from the valuation date	$	9,222,439	6.10%	$	12,064,709	7.60%	30.8%
4. Administrative Expenses	$	741,257	0.49%	$	697,395	0.44%	(5.9%)
5. Total Actuarially Required Contribution (2. + 3. + 4.)	$	24,566,860	16.24%	$	29,011,694	18.28%	18.1%
6. Estimated Member Contribution[2]	$	12,100,658	8.00%	$	12,697,161	8.00%	4.9%
7. Recommended Employer Contribution (5. - 6.)	$	12,466,202	8.24%	$	16,314,533	10.28%	30.9%

[1] Only includes Actuarial Accrued Liability for members who were vested as of the valuation date.
[2] 8.00% of normal cost compensation.

Section 1.2: Actuarially Required Contribution

		January 1, 2018	January 1, 2019
1.	Normal Cost	$ 14,603,164	$ 16,249,590
2.	Amortization of Unfunded Actuarial Accrued Liability	$ 9,222,439	$ 12,064,709
3.	Administrative Expenses	$ 741,257	$ 697,395
4.	Total Actuarially Required Contribution		
	a. Amount (1. + 2. + 3.)	$ 24,566,860	$ 29,011,694
	b. Percent of Normal Cost Compensation	16.2%	18.3%
5.	Estimated Member Contribution[1]	$ 12,100,658	$ 12,697,161
6.	Recommended Employer Contribution		
	a. Amount (4.a. - 5.)	$ 12,466,202	$ 16,314,533
	b. Percent of Normal Cost Compensation	8.2%	10.3%
7.	Estimated Employer Contribution	$ 12,100,658	$ 12,697,161
8.	Amount of Total Employer Contribution in Excess of Actuarially Required Contribution/(Deficit) (7. - 6.a.)	$ (365,544)	$ (3,617,372)

[1] 8.00% of normal cost compensation.

Section 1.3: Actuarial Gain/(Loss)

The actuarial gain/(loss) is comprised of both the liability gain/(loss) and the actuarial asset gain/(loss). Each of these represents the difference between the expected and actual values as of January 1, 2019.

1.	Expected Actuarial Accrued Liability		
	a. Actuarial Accrued Liability at January 1, 2018	$	531,589,132
	b. Normal Cost and Expected Administrative Expenses at January 1, 2018		15,344,421
	c. Interest on a. + b. to End of Year		43,754,684
	d. Benefit Payments and Administrative Expenses for Plan Year Ending December 31, 2018, with Interest to End of Year		39,885,156
	e. Expected Actuarial Accrued Liability Before Changes (a. + b. + c. - d.)		550,803,081
	f. Change in Actuarial Accrued Liability at January 1, 2019, Due to Change in Actuarial Assumptions		27,443,622
	g. Change in Actuarial Accrued Liability at January 1, 2019, Due to Change in Plan Provisions		0
	h. Expected Actuarial Accrued Liability at January 1, 2019 (e. + f. + g.)	$	578,246,703
2.	Actuarial Accrued Liability at January 1, 2019	$	582,997,691
3.	**Liability Gain/(Loss) (1.h. - 2.)**	**$**	**(4,750,988)**
4.	Expected Actuarial Value of Assets		
	a. Actuarial Value of Assets at January 1, 2018	$	378,292,120
	b. Interest on a. to End of Year		30,263,370
	c. Contributions Made for Plan Year Ending December 31, 2018		25,559,396
	d. Interest on c. to End of Year		1,022,376
	e. Benefit Payments and Administrative Expenses for Plan Year Ending December 31, 2018, with Interest to End of Year		39,885,156
	f. Expected Actuarial Value of Assets at January 1, 2019 (a. + b. + c. + d. – e.)	$	395,252,106
5.	Actuarial Value of Assets as of January 1, 2019	$	385,753,041
6.	**Actuarial Asset Gain/(Loss) (5. - 4.f.)**	**$**	**(9,499,065)**
7.	**Actuarial Gain/(Loss) (3. + 6.)**	**$**	**(14,250,053)**

Section 1.4: Normal Cost and Unfunded Actuarial Accrued Liability

A. Normal Cost

Component	January 1, 2018	January 1, 2019
Retirement Benefits	$ 9,933,804	$ 10,961,944
Withdrawal Benefits	4,058,917	4,500,447
Disability Benefits	315,553	399,158
Death Benefits	294,890	388,041
Total Normal Cost	**$ 14,603,164**	**$ 16,249,590**

B. Unfunded Actuarial Accrued Liability

The Actuarial Accrued Liability is the present value of projected plan benefits for current plan participants allocated to past service by the actuarial funding method being used. The Unfunded Actuarial Accrued Liability is the excess of the Actuarial Accrued Liability over the Actuarial Value of Assets.

Development of Unfunded Actuarial Accrued Liability	January 1, 2018	January 1, 2019
1. Actuarial Accrued Liability		
a. Active Participants		
Retirement Benefits	$ 204,809,767	$ 208,686,382
Withdrawal Benefits	3,934,291	4,820,610
Disability Benefits	2,998,623	3,537,449
Death Benefits	4,461,186	5,393,008
Total	$ 216,203,867	$ 222,437,449
b. Participants with Deferred Benefits	21,293,145	23,563,653
c. Participants Receiving Benefits	294,092,120	336,996,589
d. Total (a. + b. + c.)	$ 531,589,132	$ 582,997,691
2. Actuarial Value of Assets	$ 378,292,120	$ 385,753,041
3. Unfunded Actuarial Accrued Liability (1.d. – 2.)	**$ 153,297,012**	**$ 197,244,650**

Section 1.5: Present Value of Projected Plan Benefits

The present value of projected benefits is the value of plan benefits for current plan participants reflecting future expected earnings and service.

Present Value of Projected Benefits	January 1, 2018	January 1, 2019
1. Active Participants		
Retirement Benefits	$ 273,213,118	$ 286,374,001
Withdrawal Benefits	33,753,536	39,294,492
Disability Benefits	5,092,654	6,302,099
Death Benefits	6,356,730	8,038,859
Total	$ 318,416,038	$ 340,009,451
2. Participants with Deferred Benefits	21,293,145	23,563,653
3. Participants Receiving Benefits	294,092,120	336,996,589
4. Present Value of Projected Plan Benefits (1. + 2. + 3.)	**$ 633,801,303**	**$ 700,569,693**

Section 1.6: Ten-Year Projected Cash Flow (Retirement Benefit Payments)

Plan Year Ending	Actives	Retirees[1]	Total
12/31/2019	$ 4,016,362	$ 33,148,284	$ 37,164,646
12/31/2020	5,972,987	32,953,373	38,926,360
12/31/2021	7,649,748	32,725,725	40,375,473
12/31/2022	9,434,066	32,492,536	41,926,602
12/31/2023	11,260,733	32,227,812	43,488,545
12/31/2024	13,077,612	31,905,402	44,983,014
12/31/2025	15,029,396	31,620,601	46,649,997
12/31/2026	17,014,902	31,182,861	48,197,763
12/31/2027	19,407,399	30,745,338	50,152,737
12/31/2028	21,848,373	30,266,184	52,114,557

History of Refunds	
Year	Refund Amount
1993	$ 633,773
1994	544,504
1995	976,233
1996	1,003,922
1997	1,037,519
1998	1,132,847
1999	1,292,444
2000	1,407,960
2001	1,597,686
2002	998,709
2003	1,414,807
2004	1,634,848
2005	1,755,564
2006	1,545,738
2007	1,841,048
2008	1,997,056
2009	1,912,000
2010	1,775,640
2011	2,222,415
2012	1,548,635
2013	2,152,586
2014	1,812,170
2015	2,669,776
2016	2,750,891
2017	2,580,883
2018	3,489,279

[1] Includes Disabled Members, Beneficiaries, and Deferred Vested Members.

Section 2: Accounting Results (GASB 25)

Section 2.1: Historical Exhibits

Supplementary Schedules

Governmental Accounting Standards Board (GASB) Statement No. 25 (GASB 25) - Financial Reporting for Defined Benefit Pension Plans and Note Disclosures for Defined Contribution Plans was effective for periods between June 15, 1996 and June 15, 2013. GASB Statement No. 25 was replaced by GASB No. 67 (GASB 67) – Financial Reporting for Pension Plans effective for fiscal years beginning after June 15, 2013. GASB 67 information for the Plan is provided in a separate report.

A. Schedule of Funding Progress

GASB 25 liabilities and assets for years ending in 2004 through 2013 are shown below.

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (AAL) Entry Age (b)	Unfunded AAL (UAAL) (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a Percentage of Covered Payroll [(b-a)/c]
01/01/2005	$ 219,697,172	$ 249,693,945	$ 29,996,773	88.0%	$ 92,757,865	32.3%
01/01/2006	$ 234,660,873	$ 270,180,072	$ 35,519,199	86.9%	$ 98,915,975	35.9%
01/01/2007	$ 257,214,257	$ 293,358,174	$ 36,143,917	87.7%	$ 103,402,651	35.0%
01/01/2008	$ 285,740,434	$ 312,549,096	$ 26,808,662	91.4%	$ 105,140,088	25.5%
01/01/2009	$ 249,776,755	$ 331,357,842	$ 81,581,037	75.4%	$ 102,703,108	79.4%
01/01/2010	$ 282,841,807	$ 354,376,983	$ 71,535,176	79.8%	$ 106,956,655	66.9%
01/01/2011	$ 285,036,737	$ 375,801,894	$ 90,765,157	75.8%	$ 112,232,244	80.9%
01/01/2012	$ 280,213,871	$ 393,086,243	$ 112,872,372	71.3%	$ 116,611,366	96.8%
01/01/2013	$ 278,031,207	$ 414,530,914	$ 135,899,707	67.2%	$ 115,762,200	117.4%
01/01/2014	$ 301,765,407	$ 434,464,401	$ 132,698,994	69.5%	$ 124,039,614	107.0%

Section 2.1: Historical Exhibits (continued)

B. Schedule of Employer Contributions

GASB 25 required contributions and actual contribution percentages for years ending in 2004 through 2013 are shown below.

Year Ended December 31	Annual Required Contribution[1]	Percentage Contributed
2004	$ 5,951,443	92%
2005	$ 6,551,304	87%
2006	$ 7,387,051	83%
2007	$ 8,158,839	77%
2008	$ 7,724,074	82%
2009	$ 10,945,353	56%
2010	$ 9,603,845	75%
2011	$ 10,733,979	74%
2012	$ 11,299,311	77%
2013	$ 13,574,900	66%

[1] Beginning of year.

Section 3: Plan Assets

This section presents information regarding plan assets as reported by the plan administrator and/or the auditor. The plan assets represent the portion of total plan liabilities which has been funded as of the valuation date.

Section 3.1 A summary of the Market Value of Assets.

Section 3.2 A reconciliation of the Market Value of Assets.

Section 3.3 The Actuarial Value of Plan Assets.

Section 3.4 A history of the average annual rates of investment return.

Section 3.1: Summary of Assets

Asset Category		Market Value as of December 31, 2017 Amount	%		Market Value as of December 31, 2018 Amount	%
1. Cash and Short-Term Investments	$	4,806,131	1.3	$	5,867,277	1.6
2. Receivables						
a. Investment Distributions	$	0	0.0	$	0	0.0
b. Interest and Dividends		0	0.0		0	0.0
c. Investments Sold		301,446	0.1		88,972	0.0
d. Other Receivables		151,187	0.0		423,743	0.1
e. Total	$	452,633	0.1	$	512,715	0.1
3. Investments at Fair Value						
a. U.S. Treasury Notes	$	0	0.0	$	0	0.0
b. Fixed Income		66,783,097	17.4		75,953,866	21.1
c. Domestic Stocks and Equity		63,751,995	16.6		58,287,527	16.2
d. International Equity		152,688,716	39.7		123,604,736	34.3
e. Real Estate		78,222,823	20.4		79,817,905	22.1
f. Fund of Hedge Funds		17,943,391	4.7		17,663,217	4.9
g. Total	$	379,390,022	98.8	$	355,327,251	98.6
4. Fixed Assets	$	330,119	0.1	$	237,262	0.1
5. Total Assets	$	384,978,905	100.3	$	361,944,505	100.4
6. Liabilities						
a. Payable for Investments Purchased	$	477,684	0.1	$	795,136	0.2
b. Securities Lending Obligation in Excess of Collateral		0	0.0		0	0.0
c. Accounts Payable and Accrued Liabilities		909,773	0.2		666,323	0.2
d. Total	$	1,387,457	0.3	$	1,461,459	0.4
7. Net Assets for Pension Benefits [5. – 6.d.]	**$**	**383,591,448**	**100.0**	**$**	**360,483,046**	**100.0**

Section 3.2: Reconciliation of Assets

			2017 Plan Year		2018 Plan Year
1.	**Contributions**				
	a. Contributions from Employers	$	11,941,183	$	12,317,593
	b. Contributions from Plan Members		12,526,961		13,241,803
	c. Total	$	24,468,144	$	25,559,396
2.	**Net Investment Income**				
	a. Interest and Dividends	$	5,906,200	$	4,936,311
	b. Net Appreciation/(Depreciation)		41,223,993		(14,519,293)
	c. Miscellaneous		465,966		1,108,794
	d. Total	$	47,596,159	$	(8,474,188)
	e. Investment Expense		(1,489,146)		(1,842,498)
	f. Net Investment Income	$	46,107,013	$	(10,316,686)
3.	**Benefits and Expenses**				
	a. Retirement Benefits	$	28,096,623	$	32,520,073
	b. Refund of Contributions		2,580,883		3,489,279
	c. Death		1,283,688		1,580,360
	d. Administrative Expenses		787,070		761,400
	e. Total	$	32,748,264	$	38,351,112
5.	**Net Increase/(Decrease) [1c. + 2f. – 3e.]**	**$**	**37,826,893**	**$**	**(23,108,402)**
6.	**Net Assets Held in Trust for Pension Benefits**				
	a. Beginning of Year	**$**	**345,764,555**	**$**	**383,591,448**
	b. End of Year	**$**	**383,591,448**	**$**	**360,483,046**

Section 3.3: Actuarial Value of Assets

Schedule of Investment Gains/(Losses)				
Year Ending December 31	Original Amount	Recognized in Prior Years	Recognized This Year	Recognized in Future Years
2014	$ (3,391,713)	$ (2,713,372)	$ (678,341)	$ 0
2015	(28,304,357)	(16,982,613)	(5,660,871)	(5,660,873)
2016	3,796,285	1,518,514	759,257	1,518,514
2017	18,777,053	3,755,411	3,755,411	11,266,231
2018	(40,492,334)	0	(8,098,467)	(32,393,867)
Total	**$ (49,615,066)**	**$ (14,422,060)**	**$ (9,923,011)**	**$ (25,269,995)**

Development of Actuarial Value of Assets		
1. Market Value of Assets as of January 1, 2019	$	360,483,046
2. Deferred Investment Gain/(Loss)		(25,269,995)
3. Initial Actuarial Value of Assets as of January 1, 2019 (1. - 2.)	$	385,753,041
4. Constraining Values:		
a. 80% of Market Value (1. x .8)	$	288,386,437
b. 120% of Market Value (1. x 1.2)	$	432,579,655
5. Actuarial Value of Assets as of January 1, 2019 (3., but not less than 4.a., nor greater than 4.b.)	**$**	**385,753,041**

Section 3.4: Average Annual Rates of Investment Return

Year Ending	Actuarial Value		Market Value	
December 31	Annual	Cumulative	Annual	Cumulative
1995	11.2%	11.2%	21.4%	21.4%
1996	12.0%	11.6%	16.4%	18.9%
1997	12.4%	11.9%	16.5%	18.1%
1998	14.0%	12.4%	11.4%	16.4%
1999	13.7%[1]	12.7%	4.8%	14.0%
2000	9.5%	12.1%	0.8%	11.7%
2001	5.7%	11.2%	(2.5%)	9.5%
2002	(2.4%)	9.4%	(8.0%)	7.2%
2003	3.0%	8.7%	26.3%	9.1%
2004	5.7%	8.4%	10.9%	9.3%
2005	6.9%	8.2%	5.9%	9.0%
2006	9.9%	8.4%	14.8%	9.5%
2007	12.1%	8.6%	7.3%	9.3%
2008	(11.5%)	7.1%	(28.1%)	6.1%
2009	15.6%	7.6%	16.1%	6.7%
2010	2.3%	7.3%	13.4%	7.1%
2011	0.0%	6.8%	(2.0%)	6.6%
2012	0.7%	6.5%	12.3%	6.9%
2013	10.4%	6.7%	14.4%	7.3%
2014	9.1%	6.8%	6.9%	7.2%
2015	6.3%	6.8%	(0.7%)	6.8%
2016	7.7%	6.8%	9.2%	7.0%
2017	8.2%	6.9%	13.5%	7.2%
2018	5.4%	6.8%	(2.7%)	6.8%

[1] Includes change in asset valuation method.

Section 4: Basis of Valuation

This section describes the basis of the valuation. The participant data, plan provisions and actuarial basis are the foundation of the valuation, since these are the present facts on which the projection of benefit payments will depend. The valuation is based on the premise that the Plan will continue in existence with no future changes.

Section 4.1 The participant data used for the actuarial valuation.

Section 4.2 The plan provisions reflected in the actuarial valuation.

Section 4.3 The actuarial funding method, procedures and actuarial assumptions.

Section 4.1: Plan Participants

A. Participant Data Reconciliation

			Inactive Members[1]			
	Active Members	Deferred Benefits[2]	Retired Members	Disabled Members	Beneficiaries	Total
As of January 1, 2018	**2,693**	**330**	**1,505**	**16**	**109**	**4,653**
Age Retirements	(104)	(21)	123	-	2	-
Disability Retirements	-	-	-	-	-	-
Deaths Without Beneficiary	(4)	(1)	(19)	-	(4)	(28)
Deaths with Beneficiary	(1)	-	(8)	-	9	0
QDRO	-	-	-	-	2	2
Non-vested Terminations	(145)	-	-	-	-	(145)
Vested Terminations	(43)	43	-	-	-	-
Rehires	19	(4)	(1)	-	-	14
Cash-outs	(103)	(6)	-	-	-	(109)
Expiration of Benefits	-	-	-	-	-	-
Data Corrections	-	-	-	-	-	-
Net Change	**(381)**	**11**	**95**	**-**	**9**	**(266)**
New Entrants During the Year	479	-	-	-	-	479
As of January 1, 2019	**2,791**	**341**	**1,600**	**16**	**118**	**4,866**

[1] Excludes non-vested terminated members who are due a refund of member contributions as of the valuation date.
[2] Includes 12 deferred disableds and 4 deferred beneficiaries in 2018, and 12 deferred disableds and 3 deferred beneficiaries in 2019.

Section 4.1: Plan Participants (continued)

B. Count of Active Members

	Years of Service[1]							
Age[2]	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total**
Under 20	2	-	-	-	-	-	-	2
20-24	121	1	-	-	-	-	-	122
25-29	297	33	-	-	-	-	-	330
30-34	243	118	20	-	-	-	-	381
35-39	198	88	55	5	-	-	-	346
40-44	131	58	51	34	7	-	-	281
45-49	124	64	75	41	36	5	-	345
50-54	105	78	71	35	24	7	6	326
55-59	106	56	65	49	28	19	14	337
60-64	57	38	37	28	17	8	13	198
65+	15	24	19	12	9	4	4	87
Total	1,399	558	393	204	121	43	37	2,755

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[1] Attained service at valuation date. Excludes 36 members on leave of absence.
[2] Attained age last birthday.

Section 4.1: Plan Participants (continued)

C. Average Compensation[1]

	Years of Service[2]							
Age[3]	**0-4**	**5-9**	**10-14**	**15-19**	**20-24**	**25-29**	**30+**	**Total**
Under 20	-	-	-	-	-	-	-	-
20-24	$43,207	-	-	-	-	-	-	$43,435
25-29	$49,533	$63,577	-	-	-	-	-	$50,937
30-34	$51,064	$62,406	$65,399	-	-	-	-	$55,329
35-39	$52,784	$62,030	$70,844	$74,677	-	-	-	$58,323
40-44	$53,908	$63,645	$69,913	$75,163	$69,833	-	-	$61,791
45-49	$53,281	$63,221	$63,776	$75,951	$85,943	$74,351	-	$63,814
50-54	$53,217	$54,630	$63,260	$68,374	$73,298	$57,951	$64,776	$59,162
55-59	$51,574	$57,819	$61,125	$65,165	$67,090	$77,384	$73,192	$60,072
60-64	$51,632	$52,749	$56,175	$61,751	$67,205	$55,472	$84,999	$57,809
65+	$65,620	$50,569	$64,466	$70,194	$50,523	$56,404	$54,031	$59,328
Total	$51,126	$59,939	$64,430	$69,610	$72,873	$67,839	$73,904	$57,700

[1] Average Compensation is not shown for groupings of less than 3 members. Excludes 36 members on leave of absence.
[2] Attained service at valuation date.
[3] Attained age last birthday.

Section 4.1: Plan Participants (continued)

D. Inactive Members - Annual Benefits

Attained Age	Members With Deferred Benefits[1]		Retired Members[2]		Beneficiaries	
	No.	Benefit	No.	Benefit	No.	Benefit
Under 50	166	$ 1,444,772	-	$ -	5	$ 44,459
50 - 54	83	804,132	49	1,771,821	4	77,134
55 - 59	68	657,603	169	4,493,491	6	141,727
60 – 64	23	188,669	313	6,964,132	9	116,909
65 - 69	-	-	385	7,817,701	20	169,126
70 - 74	1	11,230	326	5,286,100	23	303,205
75 - 79	-	-	187	2,758,365	21	262,856
80 - 84	-	-	114	1,474,286	12	139,957
85+	-	-	73	777,112	18	191,484
Total	**341**	**$ 3,106,406**	**1,616**	**$ 31,343,008**	**118**	**$ 1,446,857**

[1] Includes 12 deferred disabled participants and 3 deferred beneficiaries.
[2] Includes 16 disabled participants.

Section 4.1: Plan Participants (continued)

E. Participant Statistics

Inactive Participants as of January 1, 2019	No.		Amount of Annual Benefit
Participants Receiving Benefits			
• Retired	1,616	$	31,343,008
• Beneficiaries	118		1,446,857
Total	**1,734**	**$**	**32,789,865**
Participants with Deferred Benefits			
• Vested Terminated	326	$	2,880,728
• Beneficiaries	3		22,968
• Disabled	12		202,710
Total	**341**	**$**	**3,106,406**

Statistics for Active Participants As of January 1, 2018	No.	Average Age	Average Service[1]		Average Earnings
• Continuing[2]	2,236	45.7	9.1	$	58,579
• New[3]	427	36.3	0.7		47,806
Total	**2,663**	44.2	**7.8**	**$**	**56,852**
As of January 1, 2019					
• Continuing[2]	2,244	45.3	8.8	$	59,866
• New[3]	511	36.6	0.8		48,184
Total	**2,755**	43.7	**7.3**	**$**	**57,700**

[1] Service since date of hire.
[2] Excludes 30 members on leave of absence in 2018, and 36 members on leave of absence in 2019.
[3] Includes rehires and leave-of-absence individuals returning to active service.

Section 4.1: Plan Participants (continued)

F. Projected Participant Counts[1]

Year	Actives	Participants Receiving Benefits[2]	Participants with Deferred Benefits	Total
2019	2,791	1,734	341	4,866
2020	2,418	1,892	366	4,676
2021	2,127	2,014	402	4,543
2022	1,889	2,138	439	4,466
2023	1,689	2,258	478	4,425
2024	1,516	2,373	516	4,405
2025	1,365	2,489	555	4,409
2026	1,229	2,600	597	4,426
2027	1,107	2,704	642	4,453
2028	998	2,798	678	4,474
2029	900	2,869	705	4,474
2030	813	2,929	729	4,471
2031	736	2,973	748	4,457
2032	666	3,006	765	4,437
2033	602	3,028	778	4,408
2034	543	3,041	788	4,372
2035	489	3,043	796	4,328
2036	438	3,038	803	4,279
2037	391	3,027	806	4,224
2038	347	3,009	808	4,164
2039	304	2,986	808	4,098
2040	265	2,958	807	4,030
2041	228	2,924	804	3,956
2042	193	2,883	800	3,876
2043	162	2,837	794	3,793
2044	134	2,782	787	3,703
2045	108	2,723	779	3,610
2046	86	2,654	770	3,510
2047	68	2,576	760	3,404
2048	54	2,491	749	3,294
2049	43	2,399	738	3,180

[1] Excluding future hires and former members who are due a refund.
[2] Includes Disabled Members, Beneficiaries, and Retired Members.

Section 4.2: Summary of Plan Provisions

Effective Date and Plan Year

Originally effective September 1, 1967, the plan was last amended and restated effective January 1, 2013. The plan year is January 1 through December 31.

Administration

The plan is administered by the El Paso County Board of Retirement which consists of five voting members and two Associate members. The five voting members include the Treasurer of El Paso County, two non-elected employees of participating employers, and two registered electors of El Paso County appointed by the Board of County Commissioners.

Type of Plan

A self-administered defined benefit pension plan.

Employers Included

El Paso County, Colorado; El Paso County Health Department; Pikes Peak Library District; Office of the 4th Judicial District; El Paso County Board of Retirement.

Employees Included

A Covered Employee is any elected or appointed officer or any person employed by the employer who is defined as a full-time employee or a job-share employee by the employer. A Covered Employee participates in the plan on the first date of employment.

Service

Credited Service is the sum of Past Service, Membership Service and Purchased Service and is used in determining the amount of pension benefits and benefit eligibility. Past Service and Membership Service are periods of employment before and after September 1, 1967, respectively, and are measured in years and months. Past Service is limited to five years, and Purchased Service is also limited to 5 years and is subject to additional conditions.

Compensation

Total regular compensation excluding bonuses, extra pay, overtime, etc., but including any deferred compensation. The amount of compensation for plan purposes for any participant, who first became a participant on or after January 1, 1996, is limited in any year to a maximum of $280,000 in 2019 (indexed).

Final Average Monthly Compensation

The average compensation of the highest paid 36 consecutive calendar months within the last 120 calendar months of Credited Service.

Employer Contributions

The Employer will contribute an amount that along with member contributions will be sufficient to provide benefits provided by the plan and pay all administrative expenses of the plan. Such Employer contributions cannot exceed member contribution amounts. Under CO statute, members must contribute at least as much as their employer.

Section 4.2: Summary of Plan Provisions (continued)

Member Contributions

Effective January 1, 1986, members are required to make monthly contributions equal to 6% of earnings. This was increased to 6.5% effective January 1, 2010, 7.0% effective January 1, 2011, 7.5% effective January 1, 2012, and 8.0% effective January 1, 2014. The rate of interest credited on member contributions after July 1, 2005 is 3% per year compounded monthly, or such other rate as established by the Retirement Board.

Normal Form of Benefit

The Normal Form of Benefit provided by the plan is a 10-year certain and life annuity payable monthly.

Accrued Benefit

The benefit determined as for normal retirement payable at the member's normal retirement date considering current earnings and service.

Normal Retirement Benefit

Normal retirement date for a member hired before January 1, 2010 is the first of the month on or after attainment of age 62. Normal retirement date for a member hired between January 1, 2010 and December 31, 2012 is the first of the month on or after attainment of age 62, but not before the completion of 60 months of continuous service. Normal retirement date for a member hired after December 31, 2012 is the first of the month on or after attainment of age 62, but not before the completion of 96 months of continuous service.

If hired before January 1, 2010, the monthly benefit payable at normal retirement is equal to 2.22% times final average monthly compensation, times years of Credited Service earned through December 31, 2012 plus 2.00% times final average monthly compensation, times years of Credited Service earned on or after January 1, 2013.

If hired after December 31, 2009, the monthly benefit payable at normal retirement is equal to 2.00% times final average monthly compensation, times years of Credited Service.

If hired before January 1, 2013, such benefit will not be greater than 75% of the member's final average monthly compensation. If hired after December 31, 2012, such benefit will not be greater than 60% of the member's final average monthly compensation.

Late Retirement Benefit

The benefit is equal to the Normal Retirement Benefit, recognizing Credited Service and increased compensation to postponed retirement date.

Special Early Retirement Benefit

A member may elect to retire with a special early benefit if the sum of his age and years of employment equals at least 75 upon termination of employment. If hired between January 1, 2010 and December 31, 2012, the member must have five or more years of Credited Service. If hired after December 31, 2012, the member must have eight or more years of Credited Service. The benefit will be equal to his accrued benefit unreduced for early payment.

Regular Early Retirement Benefit

An active or vested terminated member may elect to retire on the first of any month after the attainment of age 55. If hired before January 1, 2013, the member must have five or more years of Credited Service. If hired after December 31, 2012, the member must have eight or more years of Credited Service. The benefit will be equal to his accrued benefit reduced by .25% per month for each month by which his early retirement date precedes age 62.

Section 4.2: Summary of Plan Provisions (continued)

Terminated Vested Benefit

A member who terminates employment with five or more years of Credited Service if hired before January 1, 2013, or 8 years if hired after December 31, 2012, before he is eligible to receive immediate retirement benefits may elect to receive either his accumulated contributions, in lieu of all other benefits, or his vested accrued benefit payable at his normal retirement date. The member may also elect to receive a reduced benefit at an earlier commencement date.

A member who terminates employment before becoming vested is entitled to a refund of his accumulated contributions with interest.

Disability Benefit

An active member who becomes permanently and totally disabled under their employer's long-term disability insurance program, or Social Security disability, is entitled to receive a benefit payable at his normal retirement date. This benefit is based on his average monthly compensation for the calendar year prior to the calendar year in which disablement occurred and the Credited Service he would have accumulated to such retirement date. Payments will be made for ten years certain and life thereafter.

Death Benefit

Death of a Member Prior to Benefit Commencement

> In the event a member, either actively accruing service, disabled or terminated vested, dies before payments commence, the following benefits shall be paid:
>
> If such member is not vested at his death, there shall be paid the Beneficiary the member's accumulated contributions at the date of death.
>
> If such member is vested at his death, one of the following death benefits shall be payable to his spouse, at her sole option:
>
>> Two times the member's accumulated contributions at the date of death; or
>>
>> A monthly benefit, payable for life, in an amount equal to 60% of the member's Accrued Benefit on his date of death, reduced if the spouse is more than five years younger than the member. Such death benefit shall commence on the first day of the month coincident with or following the later of the date the member would have attained age 55 or date of death. If the member dies while in active service, on or after attainment of age 62 or attainment of eligibility for immediate retirement under the rule of 75, the surviving spouse is eligible to receive a monthly benefit payable for life as if the member retired the day before death and elected the 100% joint and survivor annuity.

Death after Retirement

> A lump sum death benefit of $3,000 is payable to the member's designated beneficiary. In addition, applicable benefits will be paid if the member has elected an option providing for payments to a beneficiary, or has elected the normal form of benefit and dies prior to having received benefits for 120 months, or prior to having received benefits equal to his total accumulated contributions as of the date of his retirement.

Optional Retirement Benefits

> In lieu of the Normal Form of Benefit (10-year certain and life), a member may elect to receive an adjusted amount, payable for life only, or an amount payable as a 100% or 50% joint and survivor benefit. 100% and 50% joint and survivor benefits with benefit increases if beneficiary dies first are also available options.

Section 4.3: Summary of Actuarial Methods, Procedures and Assumptions

Actuarial Cost Method

Liabilities and contributions shown in this report are computed using the **Entry Age Normal Actuarial Cost Method**.

Under this method, the **Normal Cost** is computed as the level percentage 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 pay all benefits under the Plan.

The Normal Cost for the Plan is determined by summing individual results for each active Member and determining an average normal cost rate by dividing the summed individual normal costs by the total payroll of Members before assumed retirement age.

The **Actuarial Accrued Liability** at any point in time is the theoretical amount of the fund that would have accumulated had annual contributions equal to the Normal Cost been made in prior years (it does not represent the liability for benefits accrued to the valuation date.) The **Unfunded Actuarial Accrued Liability** is the excess of the Actuarial Accrued Liability over the Actuarial Value of Plan Assets measured on the valuation date. The Unfunded Actuarial Accrued Liability as of January 1, 2019 is amortized over a 30-year closed period as a level percentage of pay, with future annual changes in Unfunded Actuarial Accrued Liability to be amortized over 25-year closed periods as a level percentage of pay.

Under this method, experience gains or losses (i.e. decreases or increases in accrued liabilities attributable to deviations in experience from the actuarial assumptions) adjust the Unfunded Actuarial Accrued Liability (UAAL).

Asset Valuation Method

The asset valuation method recognizes 20% of the market investment gain/loss each year, for a period of 5 years. The Actuarial Value of Assets must be within 20% plus/minus of the Market Value of Assets.

Valuation Procedures

No actuarial liability is included for members who terminated non-vested prior to the valuation date, except those due a refund of contributions.

The compensation amounts used in the projection of benefits and liabilities were January 1, 2019 rates of pay.

In computing accrued benefits, average earnings were determined using actual historical earnings supplied by the plan administrator.

Termination and retirement benefits were projected to be no greater than the dollar limitation required by Internal Revenue Code Section 415 for governmental plans.

Section 4.3: Summary of Actuarial Methods, Procedures and Assumptions (continued)

Actuarial Assumptions

Interest

7.5% per annum, net of investment expenses.

Mortality

RP-2000 Mortality Table Projected Generationally with Scale MP-2017

Withdrawal

Per 100 Members		
Svc	**Male**	**Female**
0	20.00	20.00
1	18.00	18.00
2	13.00	17.00
3	13.00	14.00
4	10.00	13.00
5	9.00	11.00
6	8.00	10.00
7	7.00	9.00
8	6.00	8.00
9	5.50	7.50
10	5.50	7.00
11	5.00	6.00
12	4.50	5.50
13	4.00	5.00
14	3.50	4.50
15	3.50	4.50
16+	3.00	4.00

Withdrawal rates are assumed to be zero after a member becomes eligible for retirement benefits.

Disability

Sample rates are as follows:

Per 100 Members	
Age	**Disablement**
20	0.02
25	0.03
30	0.04
35	0.06
40	0.09
45	0.13
50	0.20
55+	0.35

Section 4.3: Summary of Actuarial Methods, Procedures and Assumptions (continued)

Post-Disability Mortality

The disability mortality is based on the RP-2000 Disabled Mortality Table projected Generationally with Scale MP-2017.

Salary Increases

Anticipated salary increases include both inflationary and merit increases. Merit increases are anticipated to be greater earlier in a member's career. Sample rates are as follows:

	Percentage Increase at Attained Service		
Service	**Merit**	**Inflation[1]**	**Total**
0	5.50%	2.50%	8.00%
5	3.25	2.50	5.75
10	2.00	2.50	4.50
15	1.50	2.50	4.00
20	1.00	2.50	3.50
25+	0.50	2.50	3.00

Salary Limit Increases

2.50% per year.

Refund Assumption for Active Members Who Withdraw:

Service	Percent Electing Refund
0-4	100%
5	60%
6	55%
7	50%
8	50%
9	50%
10+	25%

Expense Loading

Loading for administrative expenses is based on an estimate for the year, provided by the Retirement Board. For 2019, the administrative expense load is $697,395.

Percent Married

75% of all members are assumed to have eligible spouses.

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[1] The payroll growth rate used for amortization of the Unfunded Actuarial Accrued Liability is equal to the inflation rate.

Section 4.3: Summary of Actuarial Methods, Procedures and Assumptions (continued)

Retirement Rates

According to the following table based on eligibility for reduced or unreduced retirement benefits.

	Per 100 Members	
Attained Age	Unreduced	Reduced
49 & Before	30	-
50	30	-
51	20	-
52	15	-
53	15	-
54	15	-
55	20	5
56	15	5
57	15	7
58	15	5
59	15	7
60	15	12
61	20	10
62	30	-
63	20	-
64	20	-
65	25	-
66	30	-
67-69	25	-
70-74	40	-
75+	100	-

Age Difference

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

Age for Commencement of Deferred Vested Benefits

Active Members

55

Terminated Members

57, or earlier if eligible for Rule of 75 before age 57

Changes in Assumptions and Methods Since the Prior Valuation

Based on the experience study for the period January 1, 2013 to December 31, 2017, the Board adopted new economic and demographic assumptions in October 2018. In addition, the amortization method for the Unfunded Actuarial Accrued Liability (UAAL) was changed to (i) a closed 30-year period for the UAAL as of January 1, 2019, and (ii) closed 25-year periods for future annual changes in the UAAL.

Section 4.4: ASOP 51 Risk Discussion

ASOP 51 is a new Actuarial Standard of Practice that was effective for measurements on or after November 1, 2018. The actuary is required to identify, but not necessarily quantify, risks that, in his/her professional judgment, may reasonably be anticipated to significantly affect the Plan's future financial condition.

Under ASOP 51, risk is defined as the potential of actual future measurements deviating from expected future measurements resulting from actual future experience deviating from actuarially assumed experience.

The more significant risk factors affecting the future funded status and contribution rates of the Plan are described below:

1. Investment Risk - The potential that future investment returns will be different than the current assumption of 7.5%. Plan costs are very sensitive to the market return. If market returns are lower than the assumed rate of return on assets, future costs will increase. The historical asset returns provided in Section 3.4 illustrate how market returns can vary over time.

2. Contribution Risk - If the actuarially determined contribution rate is not contributed each year. Currently, the employer and employees each contribute 8% of pay annually, for a total annual contribution of 16% of pay. The actuarially determined contribution rate for 2019 is 18.3% of pay (inclusive of the 8% employee contributions). By not contributing the actuarially determined contribution, the liabilities of the plan will grow faster than plan assets, which will cause the unfunded liability to continue to increase over time. This could lead to significant increases in the actuarially determined contribution rates in future years.

3. Longevity Risk - The potential that mortality rates of plan participants will be different than assumed. The mortality assumption includes an assumption for future mortality improvement. If participants live longer than the life expectancies predicted by the baseline mortality table and mortality improvement scale, benefits will be paid over a longer period of time than expected, which will lead to increases in liabilities and costs.

4. Other Demographic Risk - The potential that demographic experience patterns (especially retirement and turnover) will be different than assumed. If participants retire earlier than expected based on the retirement assumption, or lower turnover leads to more participants receiving benefits than expected, future liabilities and costs will increase.

There are certain measures that may aid in understanding the significant risks to the Plan.

Ratio of Retired Liability to Total Liability	January 1, 2018	January 1, 2019
1. Retirees and Beneficiaries	$ 294,092,120	$ 336,996,589
2. Total	531,589,132	582,997,691
3. Ratio [(1) / (2)]	55.3%	57.8%

A high percentage of liability concentrated on those in pay status indicates a mature plan (often a ratio above 60% to 65%). An increasing percentage may indicate a need for a less risky asset allocation, which may lead to a lower long-term return on asset assumption (which would increase Plan costs). Higher percentages may also indicate greater investment risk as benefit payments may be greater than contributions, thereby creating an increased reliance on investment returns.

Section 4.4: ASOP 51 Risk Discussion (continued)

Ratio of Cash Flow to Assets	Year Ending December 31, 2017	Year Ending December 31, 2018
1. Contributions	$ 24,468,144	$ 25,559,396
2. Benefit Payments	31,961,194	37,589,712
3. Cash Flow [(1) – (2)]	(7,493,050)	(12,030,316)
4. Market Value of Assets	383,591,448	360,483,046
5. Ratio [(3) / (4)]	(2.0%)	(3.3%)

When this cash flow ratio is negative, more cash is being paid out than deposited in the Plan. Negative cash flow indicates the Plan needs to rely on investment returns to cover benefit payments and/or may need to invest in more liquid assets to cover the benefit payments. More liquid assets may not generate the same returns as less liquid assets, which increases the investment risk. This risk measure should be monitored for continual negative trend.

Contribution Volatility	January 1, 2018	January 1, 2019
1. Market Value of Assets	$ 383,591,448	$ 360,483,046
2. Valuation Payroll	151,258,230	158,714,516
3. Asset Volatility Ratio (AVR) [(1) / (2)]	2.5	2.3
4. Actuarial Accrued Liability	531,589,132	582,997,691
5. Liability Volatility Ratio (LVR) [(4) / (2)]	3.5	3.7

Plans that have higher asset-to-payroll ratios tend to experience more volatile employer contributions (as a percentage of payroll) due to investment return. For example, a plan with an asset-to-payroll ratio of 10 may experience twice the contribution volatility due to investment return volatility than a plan with an asset-to-payroll ratio of 5. Plans that have higher liability-to-payroll ratios tend to experience more volatile employer contributions (as a percentage of payroll) due to changes in liability. For example, if an assumption change increases the liability of two plans by the same percent, the plan with a liability-to-payroll ratio of 10 may experience twice the contribution volatility than a plan with a liability-to-payroll ratio of 5.

Glossary of Terms

Actuarial Accrued Liability

Total accumulated cost to fund pension benefits arising from service in all prior years.

Actuarial Cost Method

Technique used to assign or allocate, in a systematic and consistent manner, the expected cost of a pension plan for a group of plan members to the years of service that give rise to that cost.

Actuarial Present Value of Projected Benefits

Amount which, together with future interest, is expected to be sufficient to pay all future benefits.

Actuarial Valuation

Study of probable amounts of future pension benefits and the necessary amount of contributions to fund those benefits.

GASB 25

Governmental Accounting Standards Board Statement Number 25, which specifies how the Annual Required Contribution (ARC) is to be calculated for fiscal years prior to June 15, 2013.

GASB 67

Governmental Accounting Standards Board Statement Number 67 amends Number 25 effective for the fiscal year beginning after June 15, 2013, and defines new financial reporting requirements for public pension plans.

Normal Cost

That portion of the actuarial present value of benefits assigned to a particular year in respect to an individual participant or the plan as a whole.

Unfunded Actuarial Accrued Liability (UAAL)

The portion of the actuarial accrued liability not offset by plan assets.

Vested Benefits

Benefits which are unconditionally guaranteed regardless of employment.