



Actuarial Valuation Report

Educational Employees' Supplementary Retirement System of
Fairfax County

Annual Valuation as of December 31, 2021

Introduction

This report documents the results of the annual actuarial valuation as of December 31, 2021 for the Educational Employees' Supplementary Retirement System of Fairfax County ("ERFC"). The report was prepared at the request of the Executive Director and is intended for use by ERFC and those designated or approved by the Board.

This valuation has been conducted in accordance with generally accepted actuarial principles and practices, including the applicable Actuarial Standards of Practice as issued by the Actuarial Standards Board.

The purpose of the valuation was to measure the funding progress of the ERFC plan. It should be noted that future actuarial measurements may differ significantly from the current measurements presented in this report due (but not limited to) to such factors as the following:

- Plan experience differing from that anticipated by the economic or demographic assumptions;
- Changes in actuarial methods or in economic or demographic assumptions;
- 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); and
- Changes in plan provisions or applicable law.

Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

In conducting the valuation, we have relied on personnel, plan design, and asset information supplied by the ERFC staff as of the valuation date. While we cannot verify the accuracy of all the information, the supplied information was reviewed for consistency and reasonableness. As a result of this review, we have no reason to doubt the substantial accuracy or completeness of the information and believe that it has produced appropriate results.

The actuarial assumptions and methods used in this valuation are described in the Actuarial Assumptions and Methods section of this report. The Board selected the economic and demographic assumptions and prescribed them for use for purposes of these calculations. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience. The undersigned are familiar with the near-term and long-term aspects of pension valuations and collectively meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein.

The information provided in this report is dependent upon various factors as documented throughout this report, which may be subject to change. Each section of this report is considered to be an integral part of the actuarial opinions.



Al-Karim Alidina, FSA, EA
Aon
+1.202.429.8550
al-karim.alidina@aon.com



Eric J. Atwater, FSA, EA
Aon
+1.404.295.5438
eric.atwater.2@aon.com

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Table of Contents

Funding Requirements

Summary	2
Assets, Liabilities & Funded Status	8

Appendix

Participant Data	17
Actuarial Assumptions and Methods	40
Actuarial Assumptions and Methods—Tables	44
Actuarial Assumptions and Methods—Discussion	48
Plan Provisions	49

Sample Benefit Calculations	55
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ERFC Regulations – Funding Policy and Employer Contribution Rate	59
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Glossary	63
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Funding Requirements

Summary

The following table illustrates the unfunded pension liability under the plan's current funding policy, which is restated below.

	Valuation Date December 31, 2020	Valuation Date December 31, 2021
Actuarial (Pension) Liability		
Retired Participants and Beneficiaries Receiving Payment	\$ 1,903,321,336	\$ 2,013,043,362
Terminated Vested Participants	146,922,684	176,715,557
Active Participants	<u>1,585,000,290</u>	<u>1,731,293,119</u>
Total	3,635,244,310	3,921,052,038
Actuarial Value of Assets	<u>(2,786,297,490)</u>	<u>(3,058,883,149)</u>
Unfunded Accrued Liability	\$ 848,946,820	\$ 862,168,889
Funded Ratio		
Actuarial Value of Assets	76.6%	78.0%
Market Value of Assets	82.1%	87.2%
Discount Rate	7.25%	7.00%

Funding Policy

The ERFC Funding Policy, as stated in the ERFC Plan Document is “to establish and receive contributions which will remain approximately level from generation to generation of citizens and which, when combined with other assets and investment return thereon, will be sufficient to pay benefits when due, while providing a reasonable margin for adverse experience.”

For funding purposes, unfunded accrued liabilities were being amortized over a closed 30-year period ending on June 30, 2040. The remaining amortization period in the December 31, 2021 valuation was 17 years. Effective with valuations on/after December 31, 2019, unfunded accrued liabilities resulting from benefit and/or assumption changes were amortized over 10 years (or less).

Effective December 31, 2021, the Trustees elected to create a new 20-year closed amortization base for changes in the unfunded liability during 2021 other than changes due to plan amendments and assumptions. Unfunded liabilities associated with assumption changes will be amortized as a level percent of pay over a closed 20-year period. The unfunded liability prior to 2021 continues to be amortized over a closed 30-year period ending on June 30, 2040. The remaining amortization period in the December 31, 2021 valuation was 17 years.

Contribution Rate

Actuarial funding valuations as of even-numbered years (2018, 2020, 2022, etc.) are used to develop an interim employer contribution rate that is then compared with the employer contribution rate that will be effective in July of the year following the valuation (2019, 2021, 2023, etc.) to ensure that the rate previously determined and adopted by ERFC remains appropriate for the plan based on the most recent plan experience.

Actuarial funding valuations as of odd-numbered years (2019, 2021, 2023, etc.) are used to develop the appropriate employer contribution rate for the two-year period beginning 18 months after the valuation date. As such, the results from the December 31, 2019 valuation were used to set the employer contribution rate of 6.70% for the period July 1, 2021 to June 30, 2023.

The results from each annual actuarial valuation are also used to develop the financial reporting results required under the Governmental Accounting Standards Board (GASB) Statements, in accordance with parameters specified by the GASB for the fiscal year ending June 30 following the valuation date.

Contribution Rate Percentage for Unfunded Accrued Liabilities

The employer contribution rate includes a charge intended to pay for the unfunded accrued liabilities. This charge is developed by projecting the unfunded liabilities from the valuation date to the beginning of the fiscal year in which the contributions will begin, and then amortizing this result over a set period as a level percent of the projected payroll.

For funding purposes, unfunded accrued liabilities were being amortized over a closed 30-year period ending on June 30, 2040. The remaining amortization period in the December 31, 2021 valuation was 17 years. Effective with valuations on/after December 31, 2019, unfunded accrued liabilities resulting from benefit and/or assumption changes were amortized over 10 years (or less).

Effective December 31, 2021, the Trustees elected to create a new 20-year closed amortization base for changes in the unfunded liability during 2021 other than changes due to plan amendments and assumptions. Unfunded liabilities associated with assumption changes will be amortized as a level percent of pay over a closed 20-year period. The unfunded liability prior to 2021 continues to be amortized over a closed 30-year period ending on June 30, 2040. The remaining amortization period in the December 31, 2021 valuation was 17 years.

The following table illustrates the development of the charge for the current unfunded accrued actuarial liabilities. If ERFC contributes this amount and actual plan experience is equal to assumed, the plan would be expected to become fully funded at the end of the respective amortization periods, and to have a lower ongoing contribution requirement in subsequent years.

	Valuation Date December 31, 2021
1. Unfunded Accrued Liability (UAL)	\$ 862,168,889
2. Expected Contribution	
a. January 1 – June 30, 2022	35,376,779
b. July 1, 2022 – June 30, 2023	71,466,410
3. Interest	<u>86,512,842</u>
4. UAL at June 30, 2023 (1 – 2a – 2b + 3) ¹	\$ 841,838,542
5. Projected Payroll for FY2024	1,791,138,100
6. Amortization Factor	N/A
7. Contribution rate for UAL ¹	3.80%

¹ See Page 6 for details

Computed Employer Contribution Rate

The following table illustrates the development of the employer contribution rate based on the current financial results of the plan and are shown for illustrative purposes. The actual employer contribution rate that will be effective in July 2022 was developed based on the results of the December 31, 2019 valuation.

Valuation Date	December 31, 2020	December 31, 2021
Contribution Rate as a Percent of Member Payroll for period ending June 30	N/A	2024 & 2025
Normal Cost (Current Cost) split by:		
Service Retirement	3.53%	3.67%
Reduced Service Retirement	0.11%	0.10%
Casualty Benefits	0.05%	0.06%
Separation Benefits	1.53%	1.61%
Administrative Expenses	<u>0.26%</u>	<u>0.25%</u>
Total	5.48%	5.69%
Less Member Contribution Rate	<u>(3.00)%</u>	<u>(3.00)%</u>
Employer Normal Cost	2.48%	2.69%
Add Contribution Rate for Unfunded Accrued Liability	<u>3.94%</u>	<u>3.80%</u>
Net Employer Contribution	6.42%	6.49%
Adjustment for ERFC 2001 Tier 2	<u>(0.08)%</u>	<u>(0.01)%</u>
Actuarially Determined Employer Contribution	<u><u>6.34%</u></u>	<u><u>6.48%</u></u>

The Funding Policy contribution for the two-year period beginning July 1, 2021 is determined by the December 31, 2019 valuation. The Board adopted a contribution rate of 6.70% of payroll.

Effective December 31, 2021, the Trustees elected to create a new 20-year closed amortization base for changes in the unfunded liability during 2021 other than changes due to plan amendments and assumptions. Unfunded liabilities associated with assumption changes will be amortized as a level percent of pay over a closed 20-year period. The unfunded liability prior to 2021 continues to be amortized over a closed 30-year period ending on June 30, 2040. The remaining amortization period in the December 31, 2021 valuation was 17 years.

The following table illustrates the development of the charge for the current unfunded accrued actuarial liabilities. If ERFC contributes this amount and actual plan experience is equal to assumed, the plan would be expected to become fully funded at the end of the respective amortization periods, and to have a lower ongoing contribution requirement in subsequent years.

Amortization of Unfunded Actuarial Liability (Gains)/Losses

The table below lists the amortization amount and balance for each UAL base as of July 1, 2023.

Date Established	Description	Projected Balance as of 06/30/2023	Original Amortization Period	Original Amortization Factor	Original Amortization Base
N/A	UAL Prior to 2021	847,972,325	17	12.15557	69,759,980
12/31/2020	Assumption Change	(13,120,910)	10	8.04772	(2,112,527)
12/31/2021	Assumption Change	123,221,144	20	13.55883	9,087,889
12/31/2021	Actuarial (Gain)/Loss	(116,234,017)	20	13.55883	(8,572,570)
Total		841,838,542	N/A	N/A	68,162,772
Projected Fiscal 2024 Payroll					1,791,138,100
Contribution Rate for Unfunded Actuarial Liability					3.80%

Employer Contribution Rate History

Fiscal Year	Valuation Date	Employee Rate	Adopted Employer Rate		ADEC
			Support	Educational	
1991	1989	2.00%	5.08%	5.53%	
1992	1990	2.00%	5.08%	5.53%	
1993	1991	2.00%	5.08%	5.53%	
1994	1992	2.00%	5.08%	5.53%	
1995	1993	2.00%	5.08%	5.53%	
1996	1994	2.00%	5.08%	5.53%	
1997	1995	2.00%	5.58%	6.03%	
1998	1996	2.00%	5.58%	6.03%	
1999	1997	2.00%	5.58%	6.03%	
			Combined July 1, 1999		
2000	1998	2.00%	4.99%		
2001	1999	2.00%	3.69%		
2002	2000	2.00%	3.69%		
2003	2001	2.00%	4.00%		
2004	2002	2.00% / 4.00%	4.29% / 2.53%		
2005	2003	4.00%	3.37%		
2006	2004	4.00%	3.37%		
2007	2004	4.00%	3.37%		
2008	2005	4.00%	3.37%		3.37%
2009	2005	4.00%	3.37%		3.14%
2010	2007	4.00%	3.20%		2.97%
2011	2007	4.00%	4.04%		4.04%
2012	2009	4.00%	4.34%		4.16%
2013	2009	3.00%	5.34%		5.38%
2014	2011	3.00%	5.60%		5.51%
2015	2011	3.00%	5.60%		5.58%
2016	2013	3.00%	5.60%		5.54%
2017	2013	3.00%	5.60%		5.59%
2018	2015	3.00%	6.24%		6.34%
2019	2016	3.00%	6.26%		6.26%
2020	2017	3.00%	6.44%		6.44%
2021	2018	3.00%	6.44%		6.58%
2022	2019	3.00%	6.70%		6.70%
2023	2020	3.00%	6.70%		6.34%
2024	2021	3.00%	TBD		6.48%

Market Value of Assets

Revenues and Expenditure	Plan Year Ending 12/31/2020	Plan Year Ending 12/31/2021
Fair Value of Assets at Beginning of Measurement Period	\$ 2,628,073,659	\$ 2,984,109,514
Revenue:		
Contributions—Employer	104,911,997	107,493,110
Contributions—Employee	49,167,029	49,480,598
Investment Return:		
Interest and Dividends	31,860,661	31,052,535
Net Appreciation	355,117,543	453,696,587
Investment Expense	(20,164,006)	(6,870,468)
Net Securities Lending	394,622	377,329
Real Estate	27,161,261	0
Miscellaneous	<u>0</u>	<u>0</u>
Total Investment Return	394,370,081	478,255,983
Total Revenue	548,449,107	635,229,691
Expenditures:		
Refunds of Member Contributions	(3,113,193)	(4,639,284)
Retirement Benefits Paid	(184,864,095)	(190,909,161)
Administrative Expenses	<u>(4,435,963)</u>	<u>(4,417,306)</u>
Total Expenditures	(192,413,252)	(199,965,751)
Net Change (Total Revenue less Total Expenditures)	<u>356,035,855</u>	<u>435,263,940</u>
Fair Value of Assets at End of Measurement Period	\$ 2,984,109,514	\$ 3,419,373,454
Receivable Contributions	<u>0</u>	<u>0</u>
Market Value of Assets at End of Measurement Period	<u>\$ 2,984,109,514</u>	<u>\$ 3,419,373,454</u>

Market Value of Assets

Asset Breakdown	Plan Year Ending 12/31/2020	Plan Year Ending 12/31/2021
Invested Assets		
Bonds	\$ 625,843,609	\$ 619,887,798
Stocks	499,889,247	465,817,116
Real Estate	160,917,837	182,076,367
Global Asset Allocation / Better Beta	286,707,073	0
Hedge Fund of Funds	117,711,528	0
Hedge Funds - Opportunistic	0	262,312,643
MACS	0	259,826,642
Private Equity	174,445,074	312,982,762
Private Debt	0	17,656,036
Infrastructure	0	2,373,860
Commingled Funds	<u>1,064,250,202</u>	<u>1,051,100,036</u>
Total Invested Assets	2,929,764,570	3,174,033,260
Short-term Investments and Cash	185,257,341	198,069,284
Receivables and Pre-Paid Expenses	5,718,578	165,892,524
Other Assets (furniture and equipment)	<u>19,979</u>	<u>0</u>
Total Assets	3,120,760,468	3,537,995,068
Liabilities	<u>(136,650,954)</u>	<u>(118,621,614)</u>
Net Assets	<u>2,984,109,514</u>	<u>3,419,373,454</u>

Portfolio Composition at Market Value	Year Ended December 31			
	2020		2021	
	Value	% of Total	Value	% of
Bonds	\$ 625,843,609	21.0 %	\$ 619,887,798	18.1 %
Stocks	499,889,247	16.8 %	465,817,116	13.6 %
Real Estate	160,917,837	5.4 %	182,076,367	5.3 %
Commingled Funds	1,064,250,202	35.7 %	1,051,100,036	30.7 %
Hedge Fund of Funds	117,711,528	3.9 %	0	0.0 %
Hedge Funds - Opportunistic	0	0.0 %	262,312,643	7.7 %
MACS	0	0.0 %	259,826,642	7.6 %
Private Equity	174,445,074	5.8 %	312,982,762	9.2 %
Private Debt	0	0.0 %	17,656,036	0.5 %
Infrastructure	0	0.0 %	2,373,860	0.1 %
Global Asset Allocation / Better Beta	286,707,073	9.6 %	0	0.0 %
Net Short-Term Investments and Cash	48,606,387	1.6 %	79,447,670	2.3 %
Receivables, Pre-Paid Expenses and Other	5,738,557	0.2 %	165,892,524	4.9 %
Total Assets	<u>\$ 2,984,109,514</u>	100.0 %	<u>\$3,419,373,454</u>	100.0 %

Actuarial Value of Assets

Year Ended December 31:	2021	2022	2023	2024	2025
A. Actuarial Value Beginning of Year	\$2,786,297,490				
B. Market Value End of Year	3,419,373,454				
C. Market Value Beginning of Year	2,984,109,514				
D. Non-Investment Net Cash Flow	(38,574,737)				
E. Investment Return Assumed Rate:	7.25%				
E1. Market Total: B-C-D	473,838,677				
E2. Amount for Immediate Recognition	200,608,234				
E3. Amount for Phased-in Recognition: E1-E2	273,230,443				
F. Phased-In Recognition of Investment Return:					
F1. Current year: 0.20 x E3	54,646,089				
F2. First Prior Year	40,785,139	54,646,089			
F3. Second Prior Year	40,836,508	40,785,139	54,646,089		
F4. Third Prior Year	(62,122,484)	40,836,508	40,785,139	54,646,089	
F5. Fourth Prior year	36,406,910	(62,122,484)	40,836,508	40,785,139	54,646,089
F6. Total Phased-In	110,552,162	74,145,252	136,267,736	95,431,228	54,646,089
G. Actuarial Value End of Year:					
G1. Preliminary Actuarial Value End of Year: A+D+E2+F6	3,058,883,149				
G2. Upper Corridor Limit: 125% x B	4,274,216,818				
G3. Lower Corridor Limit: 75% x B	2,564,530,091				
G4. Actuarial Value End of Year	3,058,883,149				
H. Actual/Projected Difference Between Market Value and Actuarial Value	360,490,305				
I. Market Rate of Return: $E1 / (C + D/2)$	15.98%				
J. Recognized Rate of Return: $(E2 + F6) / (A + D/2)$	11.25%				
K. Ratio of Actuarial Value to Market Value	89.46%				

The Actuarial Value of Assets recognizes assumed investment return (line E2) fully each year. Differences between actual and assumed investment returns (line E3) are phased-in over a closed 5-year period.

History of Actuarial Value of Assets

Year Ended December 31:	2017	2018	2019	2020
A. Actuarial Value Beginning of Year	\$2,279,741,119	\$2,398,667,997	\$2,466,004,272	\$2,582,582,541
B. Market Value End of Year	2,446,214,825	2,280,734,191	2,628,073,659	2,984,109,514
C. Market Value Beginning of Year	2,147,993,665	2,446,214,825	2,280,734,191	2,628,073,659
D. Non-Investment Net Cash Flow	(47,377,200)	(27,765,155)	(34,382,034)	(33,898,263)
E. Investment Return Assumed Rate:	7.25%	7.25%	7.25%	7.25%
E1. Market Total: B-C-D	345,598,360	(137,715,479)	381,721,502	389,934,118
E2. Amount for Immediate Recognition	163,563,808	172,896,943	177,538,961	186,008,422
E3. Amount for Phased-in Recognition: E1-E2	182,034,552	(310,612,422)	204,182,541	203,925,696
F. Phased-in Recognition of Investment Return:				
F1. Current year: 0.20 x E3	36,406,910	(62,122,484)	40,836,508	40,785,139
F2. First Prior Year	(4,301,284)	36,406,910	(62,122,484)	40,836,508
F3. Second Prior Year	(37,398,310)	(4,301,284)	36,406,910	(62,122,484)
F4. Third Prior Year	(10,380,347)	(37,398,310)	(4,301,284)	36,406,910
F5. Fourth Prior year	18,413,301	(10,380,345)	(37,398,308)	(4,301,283)
F6. Total Recognized Investment Gain or Loss	2,740,270	(77,795,513)	(26,578,658)	51,604,790
G. Actuarial Value End of Year:				
G1. Preliminary Actuarial Value End of Year: A+D+E2+F6	2,398,667,997	2,466,004,272	2,582,582,541	2,786,297,490
G2. Upper Corridor Limit: 125% x B	3,057,768,531	2,850,917,739	3,285,092,074	3,730,136,893
G3. Lower Corridor Limit: 75% x B	1,834,661,119	1,710,550,643	1,971,055,244	2,238,082,136
G4. Actuarial Value End of Year	2,398,667,997	2,466,004,272	2,582,582,541	2,786,297,490
H. Actual/Projected Difference Between Market Value and Actuarial Value	47,546,828	(185,270,081)	45,491,118	197,812,023
I. Market Rate of Return: $E1 / (C + D/2)$	16.3%	(5.66%)	16.86%	14.93%
J. Recognized Rate of Return: $(E2 + F6) / (A + D/2)$	7.4%	3.99%	6.16%	9.26%
K. Ratio of Actuarial Value to Market Value	98.1%	108.12%	98.27%	93.37%

Asset and Liabilities

Comparative Statement History

Valuation Date	Active Member Payroll	Computed Liabilities			Actuarial Value of Assets	Unfunded Accrued Liabilities	Funded %
		Retired	Other Members	Total			
(\$ in thousands)							
12/31/2012	1,297,537	1,448,291	1,117,837	2,566,128	1,935,292	630,836	75.4%
12/31/2013	1,320,309	1,482,770	1,162,730	2,645,500	2,029,005	616,495	76.7%
12/31/2014	1,340,344	1,510,717	1,223,128	2,733,845	2,123,910	609,935	77.7%
12/31/2015 ¹	1,373,096	1,590,489	1,290,214	2,880,703	2,188,037	692,666	76.0%
12/31/2016 ¹	1,436,588	1,668,485	1,364,018	3,032,503	2,279,741	752,762	75.2%
12/31/2017	1,475,449	1,733,431	1,434,510	3,167,941	2,398,668	769,273	75.7%
12/31/2018	1,554,614	1,791,189	1,542,925	3,334,114	2,466,004	868,110	74.0%
12/31/2019	1,632,427	1,841,322	1,626,828	3,468,150	2,582,582	885,568	74.5%
12/31/2020	1,633,458	1,903,321	1,731,923	3,635,244	2,786,297	848,947	76.6%
12/31/2021	1,662,801	2,013,044	1,908,009	3,921,052	3,058,883	862,169	78.0%

Expressed as Percent of Active Member Payroll - Comparative Statement History

Valuation Date	Active Member Payroll (\$ thousands)	As Percent of Active Member Payroll		
		Computed Liabilities	Actuarial Value of Assets	Unfunded Liabilities
12/31/2011	1,246,973	198%	150%	48%
12/31/2012	1,297,537	198%	149%	49%
12/31/2013	1,320,309	200%	154%	46%
12/31/2014	1,340,344	204%	158%	46%
12/31/2015	1,373,096	210%	159%	51%
12/31/2016	1,436,588	211%	159%	52%
12/31/2017	1,475,449	215%	163%	52%
12/31/2018	1,554,614	214%	159%	56%
12/31/2019	1,632,427	212%	158%	54%
12/31/2020	1,633,458	223%	171%	52%
12/31/2021	1,662,801	236%	184%	52%

¹ After change in benefits or contribution rates and actuarial assumptions or methods.

Summary of Risk Measures Based on Market Value of Assets

Actuarial Valuation Date	Funded Ratio (MVA)	Annuitant Liabilities / AAL	AAL / Payroll	UAAL / Payroll	Market Value of Assets / Payroll
12/31/2017	77.22%	0.55	2.15	0.49	1.66
12/31/2018	68.41%	0.54	2.14	0.56	1.47
12/31/2019	75.78%	0.53	2.12	0.54	1.61
12/31/2020	82.09%	0.52	2.23	0.52	1.83
12/31/2021	87.21%	0.51	2.36	0.52	2.06

Short-term fluctuations in the various Risk Measures noted above will occur due to plan experience, plan changes, and assumption and method changes being different from expected. Long-term expectations are described below:

MVA Funded Ratio: The funded ratio is expected to trend toward 100% by June 30, 2040 under the current amortization basis, which assumes that any remaining unfunded amounts prior to 2021 will be contributed by that date. Note that beginning with the 2021 valuation, unfunded liabilities arising will be amortized over a 20-year period, which may cause the long term funded status to be something other than 100%.

Annuitant Liabilities / AAL: The ratio of annuitant (retiree) liabilities to total accrued liabilities gives an indication of the maturity of the system. As the ratio increases, cash flow needs increase, and liquidity needs of the portfolio change.

AAL / Payroll: This ratio is expected to grow as the System matures.

UAAL / Payroll: The ratio of the unfunded actuarial accrued liability to payroll is expected to trend toward 0% by June 30, 2040 under the current amortization basis, which assumes that any remaining unfunded amounts prior 2021 will be contributed by that date. Note that beginning with the 2021 valuation, unfunded liabilities arising from assumption and/or benefit changes will be amortized over a 20-year period, which may cause the long term funded status to be something other than 100%.

Market Value of Assets / Payroll: As the funded ratio increases, this ratio is expected to converge to the ratio of AAL / Payroll.

Change in Unfunded Accrued Liabilities During the Year

The following table illustrates the change in unfunded accrued liabilities during the year.

	Year Ending 12/31/2020 (\$ millions)	Year Ending 12/31/2021 (\$ millions)
1. Unfunded Accrued Liability (UAL) at Start of Year	\$ 885.6	\$ 848.9
2. Normal Cost	99.5	91.1
3. Member and Employer contributions	154.1	157.0
4. Interest Accrual	<u>65.8</u>	<u>62.5</u>
5. Expected UAL before changes: (1. + 2. - 3. + 4.)	896.8	845.5
6. Change from non-recurring activities, assumptions and/or benefit changes	<u>(15.3)</u>	<u>133.0</u>
7. Expected UAL after changes: (5. + 6.)	881.5	978.5
8. Actual UAL at end of year	<u>848.9</u>	<u>862.2</u>
9. Gain/(Loss) (7. - 8.)	\$ 32.6	\$ 116.3
 Gain (loss) as percent of actuarial accrued liabilities at start of year.	 0.9%	 3.2%

Breakdown of Unfunded Liability Gain/Loss

The following table illustrates the breakdown of the unfunded gain/(loss) by source.

(\$ in Millions)	12/31/2020	12/31/2021
Economic Risks		
Pay Increases	\$ (10.5)	\$ 14.9
Investment Return	51.6	110.6
Demographic Risk		
Retirement	1.9	(14.6)
Mortality	(4.3)	3.4
Disability	(0.4)	(0.4)
Terminations	1.9	4.2
Data Adjustments and Miscellaneous	<u>(7.6)</u>	<u>(1.8)</u>
Unfunded Accrued Liability Gain/(Loss)	\$ 32.6	\$ 116.3

Experience Gains and Losses by Risk Area Comparative Statement (\$ in Millions)

Experience Period	Pay Increase	Investment Return	Retirement	Disability & Death-in-Service	Other Separations	Other ^{&}	Total Gain (Loss)	
							\$	Percent of Liabilities
1997-1998 [#]	\$ (2.6)	\$ 81.1	\$ 5.9	\$ (0.5)	\$ 6.4	\$ (13.9)	\$ 76.4	6.3 %
1998-1999 [*]	(8.4)	95.4	0.3	(1.0)	6.5	(3.8)	89.0	7.0 %
1999-2000	(17.6)	62.3	3.8	(1.2)	12.9	38.9	99.1	7.4 %
2000-2001	(9.1)	17.6	(0.3)	(1.0)	13.0	(19.5)	0.7	0.0 %
2001-2002	3.0	(50.4)	3.5	(1.1)	2.6	(29.9)	(72.3)	(4.7)%
2002-2003	18.5	(92.5)	11.0	(0.3)	4.0	(23.3)	(82.6)	(4.9)%
2003-2004 ^{#&}								
2005	(7.1)	1.9	1.0	0.1	0.0	(3.2)	(7.3)	(0.4)%
2006	(4.7)	23.6	2.0	0.0	(0.8)	2.6	22.7	1.1 %
2007	10.0	25.1	1.9	(0.2)	(2.2)	(7.2)	27.4	1.4 %
2008	4.1	(277.5)	5.2	(0.4)	(4.0)	13.5	(259.1)	(11.8)%
2009	45.0	(34.6)	8.8	(0.8)	(10.0)	(11.6)	(3.2)	(0.1)%
2010 [#]	53.1	(16.9)	5.2	0.2	(5.3)	(4.2)	32.1	1.4 %
2011	18.8	(30.6)	5.3	(0.2)	(4.2)	(4.8)	(15.7)	(0.7)%
2012	12.3	(10.8)	4.6	(0.3)	(3.4)	(10.2)	(7.8)	(0.3)%
2013	16.6	7.6	5.7	0.0	2.9	(5.1)	27.7	1.1 %
2014	8.5	(2.8)	5.8	(0.1)	0.6	2.8	14.8	0.6 %
2015 [#]	17.7	(40.2)	5.9	(0.4)	1.0	(12.4)	(28.4)	(1.0)%
2016	(14.2)	(13.9)	5.1	0.2	6.6	(5.6)	(21.8)	(0.8)%
2017	8.8	2.7	3.3	(0.0)	2.6	(19.6)	(2.2)	(0.1)%
2018	(16.1)	(77.7)	(6.0)	(1.8)	4.3	(6.0)	(103.3)	(3.3)%
2019	(12.0)	(26.5)	(4.1)	(2.7)	6.3	(1.7)	(40.7)	(1.2)%
2020 [#]	(10.5)	51.6	1.9	(4.7)	1.9	(7.6)	32.6	0.9%
2021	14.9	110.6	(14.6)	3.0	4.2	(1.8)	116.3	3.2%

Experience Study.
* Updated Gain Formulas.
@ Gain (Loss) Analysis not performed.
& Includes post-retirement mortality.

Appendix

Participant Data

The actuarial valuation was based on personnel information from Plan Sponsor records as of December 31, 2021. Following are some of the pertinent characteristics from the personnel data as of that date. Prior year characteristics are also provided for comparison purposes. Both age and service have been determined using years and months as of the valuation date.

	December 31, 2020	December 31, 2021
Active Participants		
Number	22,360	22,329
Average Age	44.4	44.5
Average Service	9.8	9.8
Average Annual Pay	\$73,053	\$74,468
Inactives With Deferred Benefits		
Number	5,415	5,783
Average Current Age	45.6	45.7
Average Monthly Benefit ¹	\$3,732	\$3,965
Inactives Receiving Payment		
Number	12,842	13,338
Average Current Age	72.5	72.7
Average Monthly Benefit	\$14,191	\$14,318
Total Participants		
Number	40,617	41,450

¹ Before adjustment for assumed retirement age and payment form.

Population Statistics – Exhibit 1

ERFC Legacy Members
WOMEN Active Members in December 31, 2021 Valuation
by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
35-39										
40-44		3	11	21	73			108	10,459,984	96,852
45-49	2	18	54	72	316	40		502	51,155,155	101,903
50-54	3	27	39	73	325	204	38	709	71,838,818	101,324
55-59	1	16	40	42	238	96	29	462	42,929,473	92,921
60			2	4	49	22	9	86	7,495,299	87,155
61		1	2	3	32	19	7	64	5,457,797	85,278
62	1		4	5	46	11	3	70	5,941,126	84,873
63		1	1	2	24	14	5	47	4,096,092	87,151
64		1	1	4	33	13	6	58	4,778,272	82,384
65				4	25	10	6	45	3,753,595	83,413
66				4	18	7	6	35	3,105,121	88,718
67				3	18	6	2	29	2,537,879	87,513
68				2	13	2	1	18	1,443,177	80,176
69				2	10	5	3	20	1,682,123	84,106
70			1		2	2	3	8	598,162	74,770
71					3	2	1	6	515,088	85,848
72				1	2		2	5	442,624	88,525
73				1	5	1	2	9	867,455	96,384
74					2			2	140,519	70,259
75 & Over					3	1	4	8	663,503	82,938
Totals	7	67	155	243	1,237	455	127	2,291	219,901,261	95,985

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years)	54.6
Service (Years)	22.3
Annual Pay	\$ 95,985

Population Statistics – Exhibit 2

ERFC Legacy Members
MEN Active Members in December 31, 2021 Valuation
by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
35-39										
40-44				4	13			17	1,737,905	102,230
45-49		3	2	5	131	24		165	18,259,865	110,666
50-54		2	1	7	139	119	12	280	30,577,985	109,207
55-59		1	3	4	73	52	12	145	15,068,201	103,919
60					12	2	2	16	1,532,965	95,810
61					18	6	4	28	2,673,314	95,475
62					10	4	2	16	1,644,325	102,770
63					10	3	1	14	1,291,530	92,252
64			1		9		2	12	1,239,428	103,286
65					4	2	1	7	752,083	107,440
66				1	3	1	3	8	863,005	107,876
67						1		1	116,909	116,909
68		1						1	80,583	80,583
69					2		2	4	368,525	92,131
70										
71					1		2	3	308,105	102,702
72					1			1	98,311	98,311
73		1						1	98,292	98,292
74		1			1			2	202,317	101,159
75 & Over					3	2	2	7	704,596	100,657
Totals	0	9	7	21	430	216	45	728	77,618,242	106,618

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years) 54.2
Service (Years) 24.2
Annual Pay \$ 106,618

Population Statistics – Exhibit 3

ERFC 2001 Tier 1 Members
WOMEN Active Members in December 31, 2021 Valuation
by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
20-24	1							1	54,403	54,403
25-29	28	334	1					363	22,630,963	62,344
30-34	50	1138	215					1,403	98,800,938	70,421
35-39	41	623	714	167				1,545	121,906,942	78,904
40-44	45	492	408	560	49			1,554	132,574,585	85,312
45-49	46	479	284	301	63			1,173	96,251,719	82,056
50-54	47	530	357	322	48			1,304	100,374,945	76,975
55-59	21	440	380	332	52			1,225	87,610,025	71,518
60	5	55	67	70	14			211	14,392,571	68,211
61	4	42	49	66	9			170	12,085,440	71,091
62	1	33	46	67	17			164	12,311,149	75,068
63	2	29	45	42	8			126	8,735,426	69,329
64		21	30	50	11			112	8,438,712	75,346
65		15	25	26	9			75	5,341,592	71,221
66		12	23	25	3			63	4,233,416	67,197
67		5	14	18	2			39	2,571,322	65,931
68		4	10	15	2			31	2,043,993	65,935
69		6	5	13	2			26	2,173,163	83,583
70	1	4	3	5	1			14	850,543	60,753
71	2	3	6	8	1			20	1,466,359	73,318
72		2	1	7				10	568,548	56,855
73		2	2	2				6	302,060	50,343
74		2	1					3	118,241	39,414
75 & Over	1	1		2	1			5	179,737	35,947
Totals	295	4,272	2,686	2,098	292	0	0	9,643	736,016,791	76,327

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years) 46.0
Service (Years) 11.1
Annual Pay \$ 76,327

Population Statistics – Exhibit 4

ERFC 2001 Tier 1 Members
MEN Active Members in December 31, 2021 Valuation
by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
20-24										
25-29	4	36						40	2,455,499	61,387
30-34	13	248	44					305	21,027,204	68,942
35-39	5	220	189	46				460	35,867,794	77,973
40-44	6	107	138	211	23			485	43,259,158	89,194
45-49	4	104	71	141	31			351	32,457,509	92,472
50-54	5	77	69	112	26			289	26,594,068	92,021
55-59	5	77	55	72	11			220	19,365,775	88,026
60		11	5	18	2			36	3,223,432	89,540
61	1	7	9	20	1			38	3,470,681	91,334
62		9	11	13	2			35	3,036,325	86,752
63		8	9	10	1			28	2,500,626	89,308
64		6	8	9				23	2,205,574	95,895
65	1	3	6	6	1			17	1,359,880	79,993
66	2	5	1	2				10	677,306	67,731
67		6	1	5				12	868,014	72,335
68	1	5	1	5				12	936,228	78,019
69		5	1	3				9	587,894	65,322
70		4		1	1			6	477,640	79,607
71			1	1				2	136,569	68,284
72			2					2	85,207	42,604
73		1	1					2	67,070	33,535
74		1						1	28,684	28,684
75 & Over	1	4		4				9	698,089	77,565
Totals	48	944	622	679	99	0	0	2,392	201,386,227	84,192

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years) 45.6
Service (Years) 11.9
Annual Pay \$ 84,192

Population Statistics – Exhibit 5

ERFC 2001 Tier 2 Members
WOMEN Active Members in December 31, 2021 Valuation
by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
15-19	2							2	51,000	25,500
20-24	531							531	26,032,031	49,025
25-29	1526							1,526	84,193,868	55,173
30-34	795							795	47,181,660	59,348
35-39	651							651	40,671,174	62,475
40-44	647							647	40,470,709	62,551
45-49	649							649	39,126,776	60,288
50-54	565							565	33,395,691	59,107
55-59	336							336	19,683,490	58,582
60	46							46	2,530,307	55,007
61	27							27	1,403,254	51,972
62	30							30	1,770,257	59,009
63	24							24	1,321,426	55,059
64	16							16	1,059,447	66,215
65	15							15	786,263	52,418
66	6							6	413,401	68,900
67	2							2	77,671	38,835
68	5							5	264,417	52,883
69	5							5	288,245	57,649
70	4							4	270,095	67,524
71										
72										
73										
74	2							2	64,246	32,123
75 & Over	2							2	189,875	94,938
Totals	5,886	0	0	0	0	0	0	5,886	341,245,303	57,976

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years) 37.9
Service (Years) 2.1
Annual Pay \$ 57,976

Population Statistics – Exhibit 6

ERFC 2001 Tier 2 Members
MEN Active Members in December 31, 2021 Valuation
by Attained Age and Years of Service

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
15-19	1							1	25,500	25,500
20-24	105							105	4,480,319	42,670
25-29	328							328	16,859,903	51,402
30-34	240							240	14,656,764	61,070
35-39	174							174	11,927,232	68,547
40-44	138							138	10,262,222	74,364
45-49	123							123	8,888,709	72,266
50-54	107							107	7,757,440	72,499
55-59	91							91	6,286,988	69,088
60	21							21	1,411,899	67,233
61	10							10	734,084	73,408
62	11							11	750,848	68,259
63	10							10	777,985	77,799
64	7							7	476,840	68,120
65	7							7	361,274	51,611
66	6							6	364,132	60,689
67										
68	2							2	175,024	87,512
69	5							5	254,005	50,801
70										
71	1							1	79,897	79,897
72	1							1	57,783	57,783
73										
74	1							1	44,547	44,547
75 & Over										
Totals	1,389	0	0	0	0	0	0	1,389	86,633,395	62,371

While not used in the financial computations the following group averages are computed and shown because of their general interest.

Age (Years)	38.6
Service (Years)	2.0
Annual Pay	\$ 62,371

Population Statistics – Exhibit 7

**ALL Active Members in December 31, 2021 Valuation
by Attained Age and Years of Service**

Age Group	Years of Completed Service at Valuation Date							Totals		Average (\$)
	0-4	5-9	10-14	15-19	20-24	25-29	30 & Up	No.	Salary (\$)	
15-19	3							3	76,500	25,500
20-24	637							637	30,566,753	47,985
25-29	1886	370	1					2,257	126,140,233	55,888
30-34	1098	1386	259					2,743	181,666,566	66,229
35-39	871	843	903	213				2,830	210,373,142	74,337
40-44	836	602	557	796	158			2,949	238,764,562	80,965
45-49	824	604	411	519	541	64		2,963	246,139,733	83,071
50-54	727	636	466	514	538	323	50	3,254	270,538,947	83,140
55-59	454	534	478	450	374	148	41	2,479	190,943,953	77,025
60	72	66	74	92	77	24	11	416	30,586,473	73,525
61	42	50	60	89	60	25	11	337	25,824,570	76,631
62	43	42	61	85	75	15	5	326	25,454,030	78,080
63	36	38	55	54	43	17	6	249	18,723,085	75,193
64	23	28	40	63	53	13	8	228	18,198,272	79,817
65	23	18	31	36	39	12	7	166	12,354,687	74,426
66	14	17	24	32	24	8	9	128	9,656,380	75,440
67	2	11	15	26	20	7	2	83	6,171,795	74,359
68	8	10	11	22	15	2	1	69	4,943,421	71,644
69	10	11	6	18	14	5	5	69	5,353,955	77,594
70	5	8	4	6	4	2	3	32	2,196,441	68,639
71	3	3	7	9	5	2	3	32	2,506,017	78,313
72	1	2	3	8	3		2	19	1,252,474	65,920
73		4	3	3	5	1	2	18	1,334,877	74,160
74	3	4	1		3			11	598,555	54,414
75 & Over	4	5		6	7	3	6	31	2,435,800	78,574
Totals	7,625	5,292	3,470	3,041	2,058	671	172	22,329	1,662,801,220	74,468

While not used in the financial computations the following group averages are computed and shown because of their general interest.

	ERFC Legacy	ERFC 2001 Tier 1	ERFC 2001 Tier 2	Total
Age (Years):	54.5	45.9	38	44.5
Service (Years)	22.8	11.3	2.1	9.82
Annual Pay	\$ 98,549	\$ 77,890	\$ 58,815	\$ 74,468

Population Statistics – Exhibit 8

**Active Members by Years of Service
December 31, 2021**

Service Years	Number of Members			Annual Pay (\$)	
	Males	Females	Total	Salary (\$)	Average (\$)
0	436	1633	2,069	112,479,659	54,364
1	267	1204	1,471	86,137,523	58,557
2	268	1206	1,474	87,198,131	59,157
3	251	1143	1,394	86,807,492	62,272
4	215	1002	1,217	77,530,871	63,707
5	256	1016	1,272	83,728,485	65,824
6	210	983	1,193	80,850,934	67,771
7	162	711	873	61,770,550	70,757
8	159	858	1,017	73,738,278	72,506
9	166	771	937	70,919,144	75,687
10	169	736	905	69,980,983	77,327
11	122	553	675	52,866,376	78,321
12	85	466	551	44,017,907	79,887
13	116	524	640	53,541,625	83,659
14	137	562	699	57,790,139	82,675
15	139	549	688	58,489,939	85,014
16	159	541	700	61,071,756	87,245
17	162	491	653	59,331,625	90,860
18	123	411	534	50,913,804	95,344
19	117	349	466	43,379,366	93,089
20	125	428	553	53,347,276	96,469
21	130	358	488	46,791,587	95,884
22	120	305	425	41,655,124	98,012
23	85	255	340	34,005,040	100,015
24	69	183	252	25,605,443	101,609
25	47	126	173	18,224,273	105,343
26	48	82	130	14,304,722	110,036
27	53	99	152	16,101,204	105,929
28	52	96	148	15,624,705	105,572
29	16	52	68	7,305,970	107,441
30 & Over	45	127	172	17,291,288	100,531
Totals	4,509	17,820	22,329	1,662,801,220	74,468

Population Statistics – Exhibit 9

Persons in Valuation - Comparative Statement
Active Members

Valuation Date	Number				Average Pay	Annual Increase In Average Pay		Price Inflation (CPI-U) Last Yr
	ERFC Legacy	ERFC 2001 Tier 1	ERFC 2001 Tier 2	Total		Last Year	Last 5 Years	
2/28/1974	7,429			7,429	\$13,087			
2/28/1975	8,075			8,075	13,693			
2/28/1976	8,609			8,609	15,929			
2/29/1980	8,990			8,990	18,901			
6/30/1983	9,359			9,359	24,104			
6/30/1985	9,596			9,596	26,229			
6/30/1986	10,084			10,084	27,523	4.90%		1.80%
6/30/1987	10,560			10,560	28,887	5.00%		3.70%
6/30/1988	10,727			10,727	31,784	10.00%		4.00%
6/30/1989	11,019			11,019	33,540	5.50%		5.20%
6/30/1990	11,539			11,539	35,702	6.40%	6.40%	4.70%
6/30/1991	12,313			12,313	36,699	2.80%	5.90%	4.70%
6/30/1992	12,308			12,308	36,356	(0.90)%	4.70%	3.10%
6/30/1993	12,330			12,330	36,539	0.50%	2.80%	3.00%
6/30/1994	12,873			12,873	37,365	2.30%	2.20%	2.50%
6/30/1995	13,287			13,287	39,215	5.00%	1.90%	3.00%
6/30/1996	13,110			13,110	40,508	3.30%	2.00%	2.80%
6/30/1997	13,473			13,473	41,098	1.50%	2.50%	2.30%
6/30/1998	13,806			13,806	42,210	2.70%	2.90%	1.70%
6/30/1999	14,449			14,449	43,326	2.60%	3.00%	2.00%
6/30/2000	15,050			15,050	45,112	4.10%	2.80%	3.70%
6/30/2001	15,955			15,955	47,628	5.60%	3.30%	3.20%
6/30/2002	15,363	711		16,074	48,635	2.10%	3.40%	1.10%
6/30/2003	13,934	3,804		17,738	48,850	0.40%	3.00%	2.10%
12/31/2004	11,856	6,864		18,720	52,234	6.90%	3.80%	3.30%
12/31/2005	10,895	8,186		19,081	55,040	5.40%	4.10%	3.40%
12/31/2006	10,065	9,306		19,371	57,396	4.30%	3.80%	2.50%
12/31/2007	9,350	10,249		19,599	59,260	3.20%	4.00%	4.10%
12/31/2008	8,791	10,940		19,731	61,383	3.60%	4.70%	0.10%
12/31/2009	8,417	11,474		19,891	60,736	(1.10)%	3.10%	2.70%
12/31/2010	7,900	12,241		20,141	59,148	(2.60)%	1.40%	1.50%
12/31/2011	7,353	13,623		20,976	59,448	0.50%	0.70%	3.00%
12/31/2012	6,801	14,718		21,519	60,297	1.40%	0.30%	1.70%
12/31/2013	6,221	15,422		21,643	61,004	1.20%	-0.10%	1.50%
12/31/2014	5,754	15,598		21,352	62,774	2.90%	0.70%	0.80%
12/31/2015	5,292	16,293		21,585	63,613	1.30%	1.50%	0.70%
12/31/2016	4,892	16,856		21,748	66,056	3.80%	2.10%	2.10%
12/31/2017	4,488	15,629	1,724	21,841	67,554	2.30%	2.30%	2.10%
12/31/2018	4,115	14,451	3,482	22,048	70,510	4.37%	2.93%	1.90%
12/31/2019	3,761	13,533	4,882	22,176	73,612	4.40%	3.23%	2.30%
12/31/2020	3,408	12,920	6,032	22,360	73,053	-0.76%	2.82%	1.40%
12/31/2021	3,019	12,035	7,275	22,329	74,468	1.94%	2.45%	7.00%

Population Statistics – Exhibit 10

Persons in Valuations - Comparative Statement
Retired Lives

Valuation Date	Number	Average Annual Benefit	Total Benefits	Active Member Payroll	Total Benefits as % of Payroll
2/28/1974	-	-	-	\$ 97,221,025	
2/28/1975	195	\$ 3,463	\$ 675,344	110,571,258	0.61%
2/28/1976	456	3,270	1,491,310	137,131,905	1.09%
2/29/1980	1,012	4,238	4,288,395	169,924,320	2.52%
6/30/1983	1,448	5,136	7,437,571	225,592,433	3.30%
6/30/1985	1,823	6,220	11,339,462	251,691,261	4.51%
6/30/1986	2,047	6,614	13,539,032	277,545,288	4.88%
6/30/1987	2,232	7,007	15,639,820	305,050,734	5.13%
6/30/1988	2,425	7,629	18,502,289	340,945,603	5.43%
6/30/1989	2,679	8,671	23,230,719	369,574,756	6.29%
6/30/1990	2,932	9,354	27,428,027	411,970,032	6.66%
6/30/1991	3,209	10,146	32,559,349	451,872,668	7.21%
6/30/1992	3,311	10,960	36,289,308	447,473,936	8.11%
6/30/1993	3,486	11,307	39,417,339	450,530,273	8.75%
6/30/1994	3,775	11,285	42,600,996	480,995,439	8.86%
6/30/1995	3,927	11,529	45,274,131	521,044,021	8.69%
6/30/1996	4,225	11,843	50,036,473	531,060,397	9.42%
6/30/1997	4,478	11,908	53,322,514	553,709,472	9.63%
6/30/1998	4,773	12,156	58,018,744	582,754,912	9.96%
6/30/1999	5,113	12,383	63,312,850	626,015,364	10.11%
6/30/2000	5,344	13,201	70,548,074	678,937,233	10.39%
6/30/2001	5,766	13,167	75,922,636	759,905,510	9.99%
6/30/2002	6,375	13,645	86,985,606	781,756,005	11.13%
6/30/2003	6,729	14,493	97,522,562	866,501,799	11.25%
12/31/2004	7,430	14,767	110,029,000	977,817,281	11.25%
12/31/2005	7,710	15,077	116,242,812	1,050,216,544	11.07%
12/31/2006	8,029	15,370	123,402,840	1,111,827,576	11.10%
12/31/2007	8,354	15,598	130,307,079	1,161,431,668	11.22%
12/31/2008	8,595	15,631	134,346,260	1,211,140,009	11.09%
12/31/2009	8,772	15,697	137,692,304	1,208,092,606	11.40%
12/31/2010	9,081	15,677	142,366,660	1,191,290,190	11.95%
12/31/2011	9,467	15,707	148,697,364	1,246,973,240	11.92%
12/31/2012	9,788	15,594	152,634,070	1,297,536,507	11.76%
12/31/2013	10,156	15,193	154,304,935	1,320,308,508	11.69%
12/31/2014	10,524	14,893	156,735,926	1,340,343,666	11.69%
12/31/2015	10,937	14,649	160,215,262	1,373,095,719	11.67%
12/31/2016	11,367	14,356	163,189,230	1,436,587,994	11.36%
12/31/2017	11,729	14,308	167,821,309	1,475,449,186	11.37%
12/31/2018	12,101	14,201	171,843,676	1,554,614,462	11.05%
12/31/2019	12,482	14,158	176,679,304	1,632,427,309	10.82%
12/31/2020	12,842	14,191	182,235,043	1,633,457,804	11.16%
12/31/2021	13,338	14,318	190,958,236	1,662,801,220	11.48%

	Average					
	All Retirees			2021 Retirees		
	At Retirement		Current Monthly Benefit	At Retirement		Current Monthly Benefit
	Age	Service		Age	Service	
<i>ERFC Legacy</i>	59.0	22.9	1,325.78	61.5	24.4	1,738.90
<i>ERFC 2001 Tier 1</i>	63.6	10.7	538.74	64.1	12.9	651.68

Population Statistics – Exhibit 11

ERFC Legacy
Original Benefit Formulas (Before July 1, 1988)
Retirees and Beneficiaries December 31, 2021
by Type of Benefit Being Paid

Type of Pension Being Paid	No.	Annual Payable For Life	Annual Temporary Supplement	Annual Current Benefits
Age and Service - Normal:				
Straight Life	174	4,196,366		4,196,366
Optional Form	8	213,873		213,873
Age and Service - Early:				
Straight Life	152	2,617,528		2,617,528
Optional Form	10	211,519		211,519
Age and Service Totals	344	7,239,286		7,239,286
Duty Disability				
Straight Life	3	121,422		121,422
Non-Duty Disability				
Straight Life	17	220,076		220,076
Age and Service Survivor				
Beneficiary, Duty Death and Non-Duty Death	38	458,293		458,293
Other Totals	58	799,791		799,791
Total Benefits	402	8,039,077		8,039,077

Population Statistics – Exhibit 12

ERFC Legacy
Benefit Formulas Effective July 1, 1988
Retirees and Beneficiaries December 31, 2021
by Type of Benefit Being Paid

Type of Pension Being Paid	No.	Annual Payable For Life	Annual Temporary Supplement	Annual Current Benefits
Age and Service - Normal:				
Straight Life	5,543	90,489,832	20,526,553	111,016,385
Optional Form	949	14,233,422	3,883,778	18,117,199
Age and Service - Early:				
Straight Life	3,666	25,381,282	9,439,331	34,820,612
Optional Form	373	2,690,005	958,812	3,648,817
Age and Service Totals	10,531	132,794,541	34,808,473	167,603,013
Duty Disability				
Straight Life	14	63,231	0	63,231
Optional Form	1	2,375	0	2,375
Non-Duty Disability				
Straight Life	109	568,819	0	568,819
Optional Form	11	54,336	0	54,336
Age and Service Survivor Beneficiary, Duty Death and Non-Duty Death	189	1,378,815	158,110	1,536,925
Other Totals	324	2,067,575	158,110	2,225,686
Total Benefits	10,855	134,862,116	34,966,583	169,828,699

Population Statistics – Exhibit 13

ERFC 2001 Tier 1
Retirees and Beneficiaries December 31, 2021
by Type of Benefit Being Paid

Type of Pension Being Paid	No.	Annual Current Benefits
Age and Service - Normal:		
Straight Life	1630	10,583,734
Optional Form	410	2,693,451
Age and Service - Early:		
Straight Life		0
Optional Form		0
Age and Service Totals	2,040	13,277,185
Duty Disability		
Straight Life		0
Optional Form		0
Non-Duty Disability		
Straight Life		0
Optional Form		0
Age and Service Survivor Beneficiary, Duty Death and Non-Duty Death	35	0
Other Totals	35	196,534
Total Benefits	2,075	13,473,719

Population Statistics – Exhibit 14

ERFC Legacy
Original Benefit Formulas (Before July 1, 1988)
Retirees and Beneficiaries December 31, 2021
Current Annual Benefits - Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
33	1	\$16,895
63	1	14,387
67	1	6,105
68	2	19,497
69	1	1,376
70	2	13,575
71	1	20,196
72	1	14,429
73	2	26,927
75	2	49,215
76	4	64,371
77	3	60,597
78	1	15,190
79	1	10,493
80-84	59	1,017,186
85-89	160	3,972,177
90 & Up	148	2,601,864
Total	390	7,924,479

Population Statistics – Exhibit 15

ERFC Legacy
Benefit Formulas Effective July 1, 1988
Retirees and Beneficiaries December 31, 2021
Current Annual Benefits - Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
Under 40	1	\$3,485
40-44	3	9,767
45	2	7,158
47	2	13,775
48	1	29,887
49	1	2,845
50	3	37,921
51	10	340,427
52	9	194,495
53	12	403,524
54	23	781,026
55	60	2,039,628
56	78	2,362,393
57	113	3,204,739
58	138	3,711,171
59	150	4,371,047
60	155	4,151,191
61	181	4,918,078
62	190	5,443,280
63	259	7,235,036
64	303	8,817,688
65	343	9,029,183
66	363	4,931,258
67	436	4,652,974
68	422	4,544,632
69	501	5,452,917
70-74	2,881	34,822,974
75-79	2,284	30,815,438
80 & Up	1,932	27,109,863
Total	10,856	169,437,799

Population Statistics – Exhibit 16

ERFC 2001 Tier 1
Retirees and Beneficiaries December 31, 2021
Current Annual Benefits - Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
Under 40	1	\$1,204
40-44	0	0
45	1	3,245
48	1	6,473
51	1	4,057
52	1	10,190
54	1	3,777
55	1	14,159
57	3	11,997
58	1	7,555
59	2	13,555
60	60	452,070
61	90	549,891
62	106	662,678
63	104	684,362
64	146	1,006,833
65	158	1,023,779
66	150	1,084,328
67	175	1,260,285
68	173	1,162,135
69	140	874,673
70-74	575	3,543,013
75-79	163	916,642
80 & Up	27	117,096
Total	2,080	13,413,996

Population Statistics – Exhibit 17

ERFC Legacy
Original Benefit Formulas (Before July 1, 1988)
Inactive Vested Members December 31, 2021
Annual Deferred Benefits – Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
59	0	\$0
60	0	0
61	0	0
62	0	0
63	0	0
64	0	0
65 & Up	0	0
Total	0	0

* In addition, there are 6 members whose accumulated contributions exceed the present value of their estimated future benefits. Liabilities for these members were set equal to their accumulated contributions.

Population Statistics – Exhibit 18

ERFC Legacy
Benefit Formulas Effective July 1, 1988
Inactive Vested Members December 31, 2021
Annual Deferred Benefits – Tabulated by Attained Ages

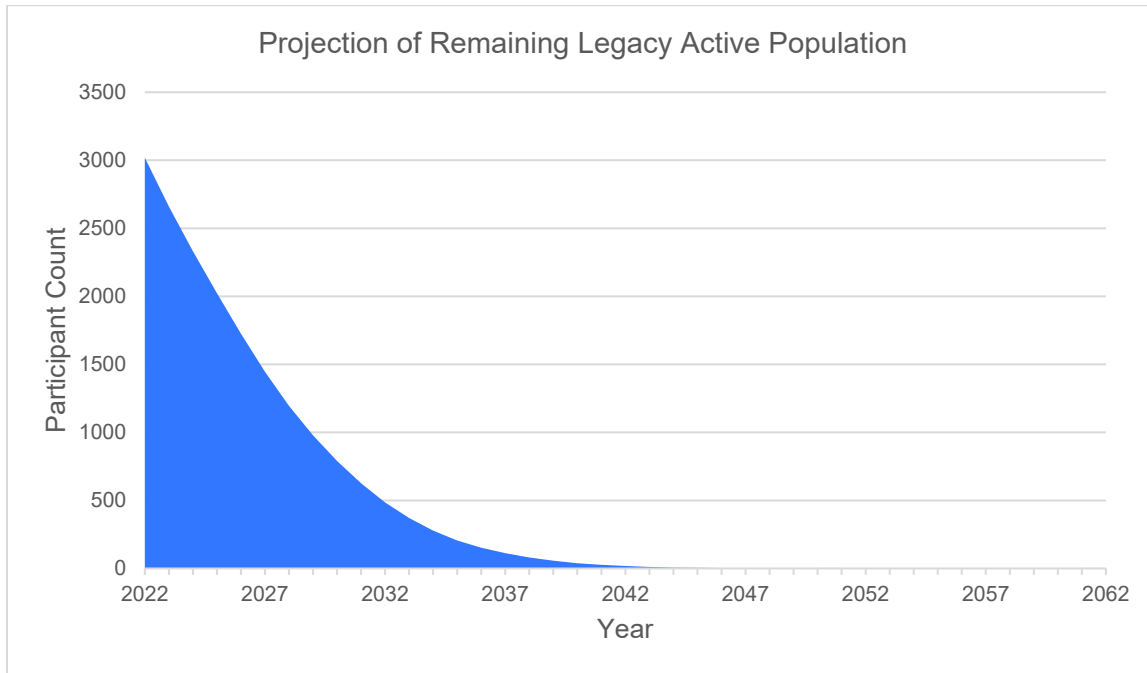
Attained Ages	No.	Annual Amount
42	2	10,277
43	37	135,311
44	51	137,457
45	66	217,057
46	66	173,091
47	97	238,127
48	93	291,467
49	92	249,275
50	114	411,647
51	113	339,616
52	98	293,546
53	97	417,539
54	92	387,084
55	77	395,154
56	59	216,693
57	44	156,108
58	36	172,638
59	29	103,505
60	28	135,075
61	31	189,865
62	27	164,514
63	18	82,814
64	25	126,609
65 & Up	57	296,536
Total	1,449	5,341,008

Population Statistics – Exhibit 19

ERFC 2001 Tier 1
Inactive Vested Members December 31, 2021
Annual Deferred Benefits – Tabulated by Attained Ages

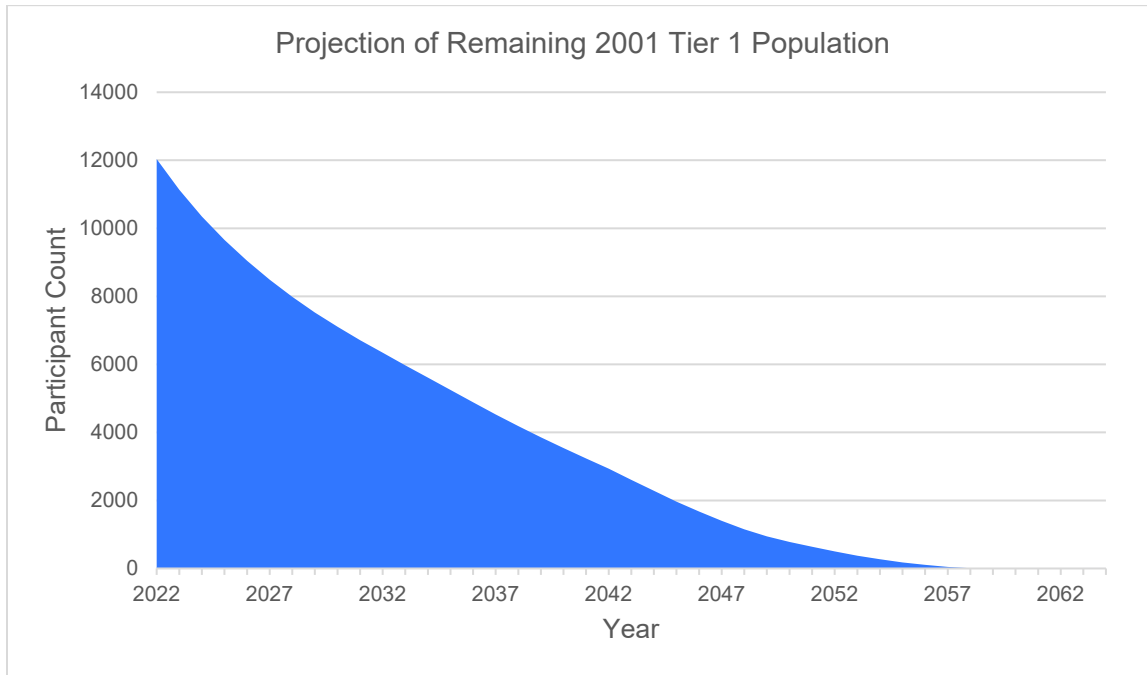
Attained Ages	No.	Annual Amount
27	1	\$2,419
28	23	56,723
29	42	104,719
30	68	189,072
31	122	366,634
32	150	465,292
33	155	491,163
34	180	584,353
35	206	694,508
36	189	675,553
37	201	751,206
38	237	935,650
39	225	896,884
40	252	962,468
41	244	1,052,501
42	241	1,036,668
43	194	808,301
44	145	623,022
45	123	553,351
46	113	545,374
47	86	410,825
48	89	408,242
49	67	329,929
50	97	442,130
51	82	349,478
52	71	361,544
53	62	291,140
54	70	367,629
55	65	297,737
56	76	413,759
57	83	368,188
58	83	407,661
59	103	540,241
60	62	261,136
61	50	203,928
62	18	99,865
63	18	79,855
64	11	42,617
65 & Up	24	114,757
Total	4,328	17,586,522

Expected Development of ERFC Legacy Present Population December 31, 2021



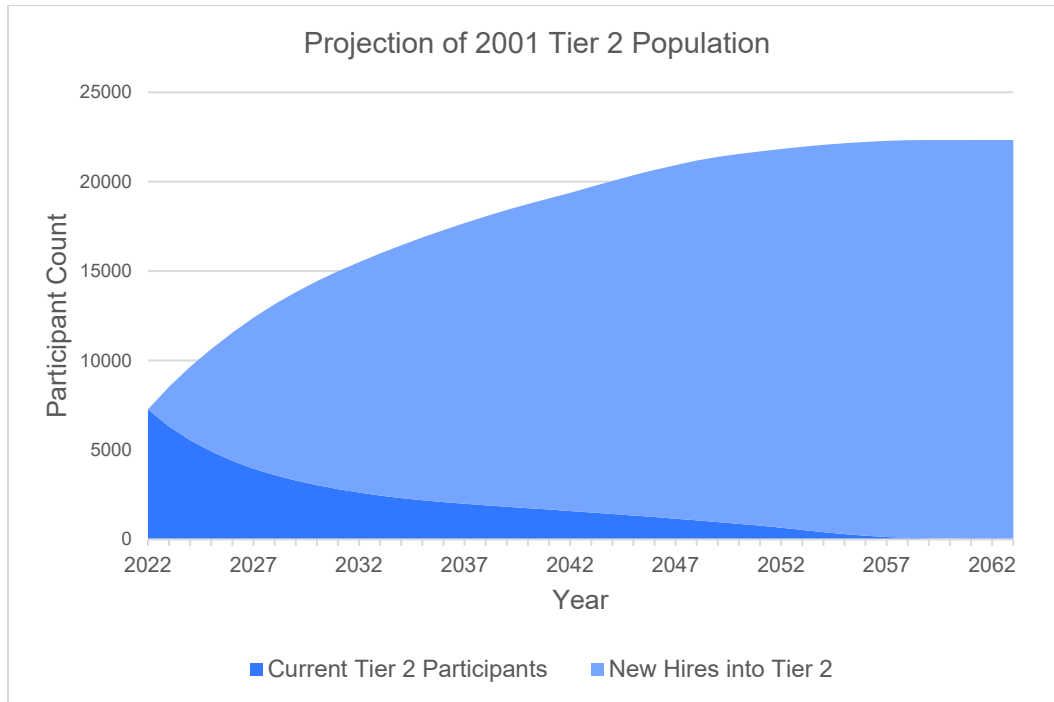
ERFC Legacy is a closed group that presently covers 3,019 active members. Approximately 99% of the present population is expected to receive monthly retirement benefits either by retiring directly from active service, or by separating from service without withdrawing contributions. Within 5 years, over half of the current membership will have left the group.

Expected Development of ERFC 2001 Tier 1 December 31, 2021



ERFC 2001 Tier 1 is a closed group that presently covers 12,035 active members. Within 11 years, over half of the current membership will have left the group.

Expected Development of ERFC 2001 Tier 2 December 31, 2021



The chart above shows the expected future development of the ERFC 2001 Tier 2 population assuming that new hires replace participants that exit the plan so as to maintain the total current active population at the December 31, 2021 level. The projection of the current ERFC Tier 2 population of 7,275 participants is shown separately from future new hires.

Actuarial Assumptions and Methods

Investment Return Rate	7.00%
Salary Increases	2022: 4.00% 2023+: See Table 1
General Inflation	2.75%
Benefit and Compensation Limits	The IRC section 415 benefit limit, the IRC section 401(a)(17) compensation limit, and Social Security TWB have been projected at 2.50% per year.
Retirement Age	
Active Participants	See Table II
Terminated Vested Participants	
Members Hired After July 1, 1988 but Before July 1, 2001:	50% at age 55, 25% at age 60 and 25% at age 65.
Members Hired After July 1, 2001:	Age 60.
Mortality Rates	
Healthy and Disabled	The mortality table used to measure retired life mortality was 102% of the male rates and 99% of the female rates of the PUB-2010 Teachers table projected generationally with Scale MP-2020. The corresponding Disabled and Employee tables were used for disability and pre-retirement mortality, respectively.
Withdrawal Rates	See Table III
Disability Rates	See Table IV
Pay Increase Timing:	Nine months after the valuation date (October 1st).
Decrement Timing	Middle of year decrements, with 100% retirement occurring at beginning of year.
Surviving Spouse Benefit/Marriage Assumption	It is assumed that 80% of males and 80% of females have an eligible spouse for purposes of death-in-service benefits, and that males are 3 years older than their spouse.
Eligibility testing	Eligibility for benefits is determined based upon the age nearest birthday and service nearest whole year on the date the decrement is assumed to occur.

Administrative Expenses	Actual administrative expenses during the measurement period are recognized in expense.
COLA Adjustment	Members hired prior to July 1, 2017: 3% (actual COLA). Members hired on/after July 1, 2017: 2.25% (long-term estimate of provision of 100% of CPI-U capped at 4%).
Actuarial Value of Assets	The actuarial value of assets is determined by adjusting the fair value of plan assets as of December 31 each year to reflect investment gains and losses during each of the last 5 years at 20% per year. The resulting value is required to be within 75% and 125% of the market value of assets as of the same date.
Incidence of Contributions	Contributions are assumed to be received continuously throughout the year based upon the computed percent of payroll shown in this report, and the actual payroll payable at the time contributions are made.
Amortization Basis for Funding	Effective December 31, 2021, the Trustees elected to create a new 20-year closed amortization base for changes in the unfunded liability during 2021 other than changes due to plan amendments and assumptions. Unfunded liabilities associated with assumption changes will be amortized as a level percent of pay over a closed 20-year period. The unfunded liability prior to 2021 continues to be amortized over a closed 30-year period ending on June 30, 2040. The remaining amortization period in the December 31, 2021 valuation was 17 years.
Actuarial Equivalence Factors (as of the date of this report):	The interest rate is 7.25% for the Option D form of payment. For Small Pension payouts the interest rate is the lesser of 7.25% or the rate for 20-year Treasury Notes raised to the next highest integer, as of the December 1st preceding the Calendar year of retirement. Mortality is based upon a 20% unisex blend of 102% of the male rates and 99% of the female rates of the PUB-2010 Teachers table projected generationally with Scale MP-2020.

Form of Benefit	<p>Single Life Annuity: 80%</p> <p>Joint & 50% Survivor Annuity: 5%</p> <p>Joint & 100% Survivor Annuity: 15%</p>
Adjustments	<p>For members hired prior to July 1, 2001 computed liabilities and normal costs are increased by 3.25% to reflect service credit for unused sick leave that may be granted at retirement. Computed liabilities and normal costs for Normal and Early retirement are reduced by 0.5% to reflect a “negative subsidy” in the Plan Document option factors. Computed liabilities for retirees that elected optional forms of benefit (with beneficiaries) are increased by 1.81% to reflect the pop-up provision.</p> <p>To account for administrative expenses, 0.25% of pay was added to the otherwise computed normal cost. This amount will be adjusted each year based on actual administrative expenses during the year and pay as of the valuation date.</p> <p>For terminated vested records past social security age with no commencement age provided, immediate commencement is assumed. No other adjustments for missing or incomplete data are made; all data issues are fully resolved before commencing the valuation.</p>
Actuarial Cost Method	Entry Age Normal cost method
Discount Rate Method	Equal to the Expected Return on Assets
Measurement Date	December 31, 2021
Measurement Period	December 31, 2020 to December 31, 2021
Valuation Date	December 31, 2021
Census Data	As of December 31, 2020, and December 31, 2021.

Changes in Funding Methods/Assumptions Since the Prior Year

Method Changes

There have been no method changes in the funding valuation since the prior year.

Assumption Changes

The funding valuation reflects the following assumption changes:

- A change in the investment return rate from 7.25% to 7.00%.
- A change in the salary increases for 2022.

Actuarial Assumptions and Methods

Table I

Salary Increase Assumption

Pay Increase Assumption			
Service Index	Merit & Seniority	Base (Economy)	Increase Next Year
0-1	4.50%	2.75%	7.25%
1-2	4.00%	2.75%	6.75%
2-3	4.00%	2.75%	6.75%
3-4	4.00%	2.75%	6.75%
4-5	4.00%	2.75%	6.75%
5-6	4.00%	2.75%	6.75%
6-7	4.00%	2.75%	6.75%
7-8	3.50%	2.75%	6.25%
8-9	3.50%	2.75%	6.25%
9-10	3.50%	2.75%	6.25%
10-11	3.00%	2.75%	5.75%
11-12	3.00%	2.75%	5.75%
12-13	2.50%	2.75%	5.25%
13-14	2.50%	2.75%	5.25%
14-15	2.00%	2.75%	4.75%
15-16	2.00%	2.75%	4.75%
16-17	1.50%	2.75%	4.25%
17-18	1.50%	2.75%	4.25%
18-19	1.50%	2.75%	4.25%
19-20	1.00%	2.75%	3.75%
20-21	1.00%	2.75%	3.75%
21-22	0.50%	2.75%	3.25%
22-23	0.50%	2.75%	3.25%
23-24	0.50%	2.75%	3.25%
24-25	0.50%	2.75%	3.25%
25+	0.00%	2.75%	2.75%

Table II
Retirement Rates

Ages	ERFC (Hired Before 7/1/2001) Type of Retirement		ERFC 2001 Tier 1 (Hired 7/1/2001-6/30/2017)			ERFC 2001 Tier 2 (Hired On/After 7/1/2017) Age Based	
	Age Based	25+ years of service	Age Based	Service	Service Based	Rule of 90 Met?	
						Yes	No
45		2.0%					
46		2.0%					
47		2.0%					
48		2.0%					
49		2.0%					
50		2.0%					
51		2.0%					
52		7.0%					
53		7.0%					
54		15.0%					
55	12.5%	40.0%		30	17.5%		
56	12.5%	25.0%		31	17.5%	35.0%	0.0%
57	12.5%	25.0%		32	12.5%	35.0%	0.0%
58	12.5%	15.0%		33	12.5%	35.0%	0.0%
59	12.5%	25.0%		34	12.5%	35.0%	0.0%
60	12.5%	25.0%	10.0%	35	10.0%	35.0%*	0.0%
61	17.5%	20.0%	10.0%	36	10.0%	35.0%	0.0%
62	20.0%	30.0%	10.0%	37	10.0%	35.0%	0.0%
63	20.0%	25.0%	15.0%	38	25.0%	35.0%	0.0%
64	25.0%	25.0%	15.0%	39	40.0%	35.0%	0.0%
65	40.0%	35.0%	25.0%	40 & Up	100.0%	35.0%	0.0%
66	40.0%	45.0%	30.0%			35.0%	0.0%
67	35.0%	35.0%	25.0%			35.0%	30.0%
68	30.0%	35.0%	20.0%			35.0%	15.0%
69	30.0%	35.0%	20.0%			35.0%	15.0%
70	40.0%	35.0%	45.0%			35.0%	15.0%
71	25.0%	35.0%	30.0%			35.0%	15.0%
72	35.0%	35.0%	30.0%			35.0%	15.0%
73	35.0%	35.0%	30.0%			35.0%	15.0%
74	35.0%	35.0%	30.0%			35.0%	15.0%
75 & Over	100.0%	100.0%	100.0%			100.0%	100.0%

* The probability is 60% at age 60 for people who first meet the Rule of 90 at age 60.

The age column index does not apply to the service based retirements. In ERFC 2001 Tier 1, an individual can retire at 30 years of service regardless of age. In ERFC 2001 Tier 2, an individual would be able to retire at FSSA with 5 years of service or when the sum of age and service is greater than or equal to 90. FSSA is assumed to be age 67 for members hired on/after July 1, 2017

Table III

Withdrawal Rates

Service	% of Active Participants Withdrawing	
	Males	Females
0 - 1	17%	16%
1 - 2	12%	14%
2 - 3	12%	13%
3 - 4	11%	12%
4 - 5	11%	12%
5 - 6	9%	11%
6 - 7	7%	10%
7 - 8	7%	10%
8 - 9	7%	8%
9 - 10	6%	8%
10 - 11	5%	7%
11 - 12	4%	7%
12 - 13	4%	6%
13 - 14	3%	5%
14 - 15	3%	5%
15 - 16	3%	4%
16 - 17	2%	3%
17 - 18	2%	2%
18 - 19	2%	2%
19 - 20	2%	2%
20 - 21	2%	2%
21 - 22	2%	2%
22 - 23	2%	2%
23 - 24	2%	2%
24 - 25	2%	2%

In addition, forfeiture occurs when a vested person separates from service and withdraws contributions thereby forfeiting future rights to an employer financed benefit. The total probability of forfeiture is obtained by multiplying the probability of withdrawal above by 10%. Forfeiture rates do not apply to individuals who are eligible for retirement at time of termination.

Table IV
Sample Rates of Separation From Active Employment

Ages	Disability			
	Ordinary		Duty	
	Men	Women	Men	Women
20	0.0117%	0.0048%	0.0029%	0.0012%
21	0.0117%	0.0048%	0.0029%	0.0012%
22	0.0117%	0.0048%	0.0029%	0.0012%
23	0.0142%	0.0074%	0.0036%	0.0018%
24	0.0149%	0.0081%	0.0037%	0.0020%
25	0.0146%	0.0082%	0.0036%	0.0020%
26	0.0142%	0.0082%	0.0035%	0.0021%
27	0.0140%	0.0086%	0.0035%	0.0022%
28	0.0142%	0.0094%	0.0036%	0.0024%
29	0.0149%	0.0106%	0.0037%	0.0027%
30	0.0158%	0.0122%	0.0040%	0.0031%
31	0.0171%	0.0140%	0.0043%	0.0035%
32	0.0186%	0.0158%	0.0046%	0.0040%
33	0.0202%	0.0178%	0.0050%	0.0044%
34	0.0218%	0.0196%	0.0054%	0.0049%
35	0.0234%	0.0214%	0.0059%	0.0054%
36	0.0252%	0.0232%	0.0063%	0.0058%
37	0.0271%	0.0250%	0.0068%	0.0062%
38	0.0291%	0.0268%	0.0073%	0.0067%
39	0.0314%	0.0287%	0.0078%	0.0072%
40	0.0339%	0.0308%	0.0085%	0.0077%
41	0.0367%	0.0331%	0.0092%	0.0083%
42	0.0399%	0.0357%	0.0100%	0.0089%
43	0.0435%	0.0386%	0.0109%	0.0097%
44	0.0475%	0.0419%	0.0119%	0.0105%
45	0.0520%	0.0456%	0.0130%	0.0114%
46	0.0570%	0.0498%	0.0143%	0.0124%
47	0.0626%	0.0545%	0.0157%	0.0136%
48	0.0689%	0.0598%	0.0172%	0.0149%
49	0.0760%	0.0658%	0.0190%	0.0164%
50	0.0842%	0.0726%	0.0210%	0.0181%
55	0.1469%	0.1228%	0.0367%	0.0307%
60	0.2447%	0.1770%	0.0612%	0.0443%

Actuarial Assumptions and Methods

Discussion of Actuarial Assumptions and Methods

For the funding valuation, ERFC selected the economic and demographic assumptions and prescribed them for use for purposes of compliance with the state's funding regulations. Aon provided guidance with respect to these assumptions, and it is our belief that the assumptions represent reasonable expectations of anticipated plan experience. The actuarial cost and amortization methods are not prescribed by state or local statute.

While the method used to value assets is prescribed by ERFC, Aon provided guidance with respect to the use of this method, and it is our belief that the method is appropriate for funding purposes.

Calculation of Normal Costs and Liabilities

The method used to calculate the normal cost and projected benefit obligation for determining the employer contribution rate is the entry age normal cost method. Under this cost method, the actuarial accrued liability is based on a prorated portion of the present value of all benefits earned to date over the expected future working life time of plan participants. The proration is determined so that the cost with respect to service accrued from date of hire is recognized as a level percentage of pay each year. The Normal Cost is equal to the prorated cost for the year of the valuation.

Normal Costs and projected benefit obligations are determined separately for ERFC Legacy, ERFC Tier 1 and ERFC Tier 2 participants and blended together to produce the results shown in this report. It is expected that over time, the plans Normal Cost will become the Normal Cost for the Tier 2 participants. Unfunded actuarial accrued liabilities are amortized to produce contribution amounts (principal and interest) which are level percent-of-payroll contributions, assuming payroll grows at the rate indicated elsewhere in this report.

Plan Provisions – ERFC Legacy

Eligibility to Participate	ERFC Members Hired After July 1, 1988 but Before July 1, 2001
Contributions	Effective July 1, 2012, members contribute 3% of their salaries. Interest credits are 5% annually through June 30, 2017, and 4% annually thereafter. If a member leaves covered employment before becoming eligible to retire, accumulated contributions are returned upon request. Members who receive a refund of contributions and are later rehired become members of ERFC 2001 Tier 2.
Eligibility for Retirement	
Normal Retirement	A member may retire any time after reaching the service retirement date, which is either (i) age 65 with 5 years of service or (ii) age 55 with 25 years of service
Early Retirement	A member with 25 years of service but younger than age 55 may retire after age 45. A member with less than 25 years of service and younger than age 65 may retire after age 55.
Disability Retirement	An active member with 5 or more years of service who becomes totally and permanently disabled may be retired and receive a disability pension. The 5-year service requirement is waived if the disability is service-connected.
Normal Retirement Benefit	For payment periods during the retired member's lifetime 103% times (i) minus (ii) where: <ul style="list-style-type: none"> (i) means 1.85 percent of the FAC multiplied by years of credited service, and (ii) means 1.65 percent of the portion of VRS FAC in excess of \$1,200, multiplied by applicable years of creditable Virginia service; provided if the member is younger than age 65 and if creditable Virginia service is less than 30 years, the result of such multiplication shall be reduced for each month before the earlier of: <ul style="list-style-type: none"> (1) attainment of age 65; and (2) the date when 30 years of service would have been completed.

The reduction shall be one-half of 1% for each of the first 60 months and four-tenths of one percent for each month beyond 60 months, if any.

For payment periods, if any, before the age the member becomes eligible for full Social Security benefits, an additional temporary benefit equals to 103% times 1.00 percent of the FAC multiplied by years of credited service.

Early Retirement Benefit

Accrued benefit to early retirement date payable at normal retirement date reduced according to the following schedule:

After 25 years of service: Service Retirement amount reduced to reflect retirement age younger than age 55.

After 5 years of service, but before 25 years of service: For payment periods during the retired member's lifetime, the Service Retirement amount payable at age 65 reduced to reflect retirement age younger than age 65. For payment periods before the age the member becomes eligible for full Social Security benefits, an additional temporary benefit equal to the Service Retirement temporary benefit reduced to reflect retirement age younger than age 65.

Disability Benefit

The amount is 103% times a lifetime pension equal to 0.25 percent of the FAC multiplied by years of credited service. Credited service shall be increased by the time period from disability retirement to the date when the member would have reached the service retirement date. The minimum pension payable is 2.5 percent of FAC.

Vested Deferred Benefit Eligibility

An inactive member with 5 or more years of service will be entitled to a pension with payments beginning at age 55, provided she/he does not withdraw accumulated member contributions.

Amount

Calculated in the same manner as early retirement benefits.

Final Average Compensation (FAC)

A member's final average compensation is the average of the 3 highest consecutive years of salary during eligible employment.

Forms of Payment

Normal Form

The assumed normal form of benefit is the straight life form.

Optional Forms

Option A: 100% Joint and Survivor benefit. Benefit is 85% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 94% of the straight life amount.

Option B: 50% Joint and Survivor benefit. Benefit is 91% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 97% of the straight life amount.

Option C: 10 years Certain and Life. Benefit is 96% of the straight life amount.

Option D: Single sum payment not exceeding member's accumulated contribution balance, plus a single life annuity actuarially reduced from the pension amount otherwise payable.

Post-Retirement Increases

The amount of the monthly benefit is adjusted each March 31st, by 3% compounded annually, beginning with the March 31st which is more than three full months after the member's effective retirement date. Pensions of members that retire in the immediately preceding calendar year are increased by 1.489% (one-half a year's increase).

Spouse's Preretirement Death Benefit

Statutory Death Benefits

Eligibility

An active member with 5 or more years of service who dies will have benefits payable to the surviving spouse or other eligible beneficiary. The 5-year service requirement is waived if the death is service-connected.

Amount

If the member is eligible for a service or reduced service retirement then an eligible named beneficiary will receive such benefits reduced based upon an Option A (in the case of a spouse or an ex-spouse subject to a DRO) or Option B (in case of another eligible beneficiary) election. If not, the eligible named beneficiary will receive an amount equal to 103% times a lifetime pension equal of 0.25% of the FAC multiplied by years of credited service, and also reduced in connection with an Option A or Option B election. Credited service shall be increased by the time period from the date of death to the date when the member would have reached service retirement with a minimum of 10 years of service used, provided the death was service-connected. If a named beneficiary is not eligible for either of these types of benefits, the named beneficiary will receive a refund of the member's accumulated contributions.

Alternative Benefits Available to Members with Some Service Before July 1, 1988

Service Retirement: Alternate Amount
After Full Social Security Age

A member with service before 7/1/1988 may elect, at time of retirement, to receive an alternate benefit amount for payment periods after full Social Security age. The Alternative Guarantee amount is the amount that would have been received after the individual reached eligibility for full Social Security benefits under the Old Plan (pre – July 1, 1988) formulas. The amount is 103% of the total of:

- (i) the amount payable under June 30, 1987 benefit provisions,
- (ii) plus, if the retiring member is younger than full Social Security age and if creditable Virginia service is less than 30 years, 1.65 percent of VRS average final compensation in excess of \$1,200, multiplied by years of creditable Virginia service, and further multiplied by a certain percent based upon the number of months that retirement occurs before reaching the earlier of the above two conditions; such percent is one half of one percent for each of the first 60 such months and four-tenths of one percent for each of the next 60 such months, if any.

Reduced Service Retirement: Alternate
Amount with 25 Years or more Years of
Service

By election at time of retirement, such a member may elect to receive 103% of the following combination of benefits:

- (i) To age 55, 2.85 percent of the 3-year average annual salary multiplied by years of credited service, then actuarially reduced to reflect retirement age younger than age 55;
- (ii) From age 55 to 65, the amount to age 55 reduced by: 1.65 percent of the portion of VRS average final compensation in excess of \$1,200, multiplied by applicable years of creditable Virginia service; provided if creditable Virginia service is less than 30 years, the result of such multiplication shall be actuarially reduced for each month before the earlier of (1) attainment of age 65; and (2) the date when 30 years' service would have been completed; and
- (iii) From age 65 for life, the amount payable at age 65 according to June 30, 1987 provisions or the amount payable at age 65 according to July 1, 1988 provisions.

Plan Changes Since the Prior Year

The financial accounting valuation does not reflect any plan changes.

Plan Provisions – ERFC 2001 Tier 1

Eligibility to Participate	Members Hired On/After July 1, 2001 but Before July 1, 2017 (ERFC 2001 Tier 1)
Contributions	Effective July 1, 2012, members contribute 3% of their salaries. Interest credits are 5% annually through June 30, 2017, and 4% annually thereafter. If a member leaves covered employment before becoming eligible to retire, accumulated contributions are returned upon request. Members who receive a refund of contributions and are later rehired become members of ERFC 2001 Tier 2.
Eligibility for Retirement Normal Retirement	A member may retire at age 60 with 5 or more years of credited service, or after 30 years of credited service regardless of age.
Normal Retirement Benefit	The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC at retirement multiplied by years of credited service. If necessary, the pension will be increased to make the reserve value of the pension equal to the member's accumulated contributions as of the retirement effective date.
Vested Deferred Benefit Eligibility	Any member with 5 or more years of credited service who terminates employment prior to the service retirement date, will be eligible to receive a deferred vested pension commencing at age 60, provided accumulated contributions are left on deposit with the Plan.
Amount	The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC at termination multiplied by years of credited service. If necessary, the pension will be increased to make the reserve value of the pension equal to the member's accumulated contributions as of the effective retirement date
Final Average Compensation (FAC)	A member's Final Average Compensation is the average of the 3 highest years of salary during eligible employment.
Forms of Payment Normal Form	The assumed normal form of benefit is the straight life form.
Optional Forms	Option A: 100% Joint and Survivor benefit. Benefit is 85% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 94% of the straight life amount.

Option B: 50% Joint and Survivor benefit. Benefit is 91% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 97% of the straight life amount.

Option C: 10 years Certain and Life. Benefit is 96% of the straight life amount.

Post-Retirement Increases

The amount of the monthly benefit is adjusted each March 31st, by 3% compounded annually, beginning with the March 31st which is more than three full months after the member's effective retirement date. Pensions of members that retire in the immediately preceding calendar year are increased by 1.489% (one-half a year's increase).

Spouse's Preretirement Death Benefit

Statutory Death Benefits

Eligibility

Any member with 5 or more years of credited service who dies before beginning to receive a pension will have benefits payable to the named beneficiary.

Amount

The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC multiplied by years of credited service at the date of death. If necessary, the pension will be increased to make the reserve value of the pension equal to the member's accumulated contributions as of the date of death. The pension will be adjusted in accordance with an Option A (in the case of a spouse or an ex-spouse subject to a DRO) or Option B (in case of another eligible beneficiary) election payable immediately unless the member did not reach the service retirement eligibility prior to death, in which case the pension is reduced for each month that the member was younger than age 60 on the date of death in the following manner:

- a. One-half of 1% for each of the first 60 months and four-tenths of one percent for each month beyond 60 months (the number of months used for reduction is not to exceed the difference between the member's credited service at death and 30 years).

Plan Changes Since the Prior Year

The financial accounting valuation does not reflect any plan changes.

Plan Provisions – ERFC 2001 Tier 2

Eligibility to Participate	Members Hired On/After July 1, 2017 (ERFC 2001 Tier 2)
Contributions	Members contribute 3% of their salaries. Interest credits are 4% annually. If a member leaves covered employment before becoming eligible to retire, accumulated contributions are returned upon request.
Eligibility for Retirement Normal Retirement	A member may retire at Full Social Security Age (FSSA) with 5 or more years of credited service, or when the sum of age plus service is greater than or equal to 90 (i.e., “Rule of 90”).
Normal Retirement Benefit	The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC at retirement multiplied by years of credited service. If necessary, the pension will be increased to make the reserve value of the pension equal to the member’s accumulated contributions as of the retirement effective date.
Vested Deferred Benefit Eligibility	Any member with 5 or more years of credited service who terminates employment prior to the service retirement date, will be eligible to receive a deferred vested pension commencing at FSSA, provided accumulated contributions are left on deposit with the Plan.
Amount	The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC at termination multiplied by years of credited service. If necessary, the pension will be increased to make the reserve value of the pension equal to the member’s accumulated contributions as of the effective retirement date.
Final Average Compensation (FAC)	A member’s Final Average Compensation is the average of the 5 highest years of salary during eligible employment.
Forms of Payment Normal Form	The assumed normal form of benefit is the straight life form.
Optional Forms	Before the effective retirement date, a retiring member may elect one of the following options: Option A: 100% Joint and Survivor benefit. Benefit is 85% of the straight life amount adjusted for the

difference in age between the retiree and beneficiary. The maximum benefit is 94% of the straight life amount.

Option B: 50% Joint and Survivor benefit. Benefit is 91% of the straight life amount adjusted for the difference in age between the retiree and beneficiary. The maximum benefit is 97% of the straight life amount.

Option C: 10 years Certain and Life. Benefit is 96% of the straight life amount

Post-Retirement Increases

The amount of the monthly benefit is adjusted each March 31st, by 100% of the Consumer Price Index (CPI-U) (with a cap of 4%) compounded annually, beginning with the March 31st which is more than three full months after the member's effective retirement date. Pensions of members that retire in the immediately preceding calendar year are increased by one-half a year's increase.

Spouse's Preretirement Death Benefit Statutory Death Benefits Eligibility

Any member with 5 or more years of credited service who dies before beginning to receive a pension will have benefits payable to the named beneficiary.

Amount

The amount is a lifetime pension equal to 0.8% (eight-tenths of one percent) of FAC multiplied by years of credited service at the date of death. If necessary, the pension will be increased to make the reserve value of the pension equal to the member's accumulated contributions as of the date of death. The pension will be adjusted in accordance with Option A (in the case of a spouse or an ex-spouse subject to a DRO) or Option B (in case of another eligible beneficiary) election payable immediately unless the member did not reach the service retirement eligibility prior to death, in which case the pension is reduced for each month that the member was younger than service retirement eligibility on the date of death in the following manner:

One-half of 1% for each of the first 60 months and four-tenths of one percent for each month beyond 60 months (the number of months used for reduction is based on the lesser of FSSA or the age the member would have attained "Rule of 90").

Plan Changes Since the Prior Year

There were no plan changes during the year.

Sample Benefit Calculations

Sample Benefit Computation for ERFC Legacy Member Retiring After 30 Years of Service

Data:

A.	7/1/1963	Date of Birth
B.	7/1/2018	Effective Date
C.	7/1/1988	Membership Date
D.	30.00	ERFC Credited Service
E.	30.00	VRS Creditable Service
F.	55.00	Age
G.	Service	Retirement Type
H.	\$60,000.00	3-Year Average Salary
I.	\$60,000.00	5-Year Average Salary

The following table illustrates the calculation of the ERFC Monthly benefit

Lifetime Portion of Full Service Benefit

J.	ERFC Legacy Formula Benefit: $1.85\% \times 30 \text{ yrs.} \times \$60,000 =$	\$ 33,300.00
K.	minus VRS Adjustment of: $1.65\% \times 30 \text{ yrs.} \times (\$60,000 - \$1,200) \times 100\% =$ (100% is the VRS Early Service Retirement Reduction Factor for no years prior to the earlier of age 65 or 30 years of service)	<u>29,106.00</u>
L.	Sub Total	4,194.00
M.	plus additional 3% benefit adjustment	<u>125.82</u>
N.	Total of Lifetime Portion	4,319.82

Additional Temporary Benefit until age FSSA (Full Social Security Age)

O.	Temporary Benefit Formula: $1\% \times 30 \text{ yrs.} \times \$60,000 =$	18,000.00
P.	plus additional 3% benefit adjustment	<u>540.00</u>
Q.	Total of Additional Temporary Benefit	18,540.00
R.	Monthly benefit effective 07/01/2017 at age 55 payable until FSSA, $(N + Q)/12 =$	1,904.99
S.	Monthly benefit effective 07/01/2030 at FSSA payable for life, $N/12 =$	359.99

The above computation does not reflect the alternative "guarantee" benefit which this member might elect. Members are eligible for a Lifetime Level Benefit (LLB) that is calculated by determining the annuitized value of the greater of their accumulated contribution balance or the present value of the currently provided benefit.

Sample Benefit Computation for ERFC 2001 Tier 1 Member Retiring After 28 Years of Service

Data:

A.	7/1/1969	Date of Birth
B.	7/1/2029	Effective Date
C.	7/1/2001	Membership Date
D.	28.00	ERFC Credited Service
E.	N/A	VRS Creditable Service
F.	60.00	Age
G.	Service	Retirement Type
H.	\$60,000.00	3-Year Average Salary

The following table illustrates the calculation of the ERFC Monthly benefit

Lifetime Portion of Full Service Benefit

ERFC 2001 Tier 1 Formula Benefit: $0.80\% \times 28 \text{ yrs.} \times \$60,000/12 =$	\$1,120.00
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Sample Benefit Computation for ERFC 2001 Tier 2 Member Retiring After 30 Years of Service

Data:

A.	7/1/1985	Date of Birth
B.	7/1/2047	Effective Date
C.	7/1/2017	Membership Date
D.	30.00	ERFC Credited Service
E.	N/A	VRS Creditable Service
F.	62.00	Age
G.	Service	Retirement Type
H.	\$65,000.00	5-Year Average Salary

The following table illustrates the calculation of the ERFC Monthly benefit

Lifetime Portion of Full Service Benefit

ERFC 2001 Tier 2 Formula Benefit: $0.80\% \times 30 \text{ yrs.} \times \$65,000/12 =$	\$1,300.00
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ERFC Regulations – Funding Policy and Employer Contribution Rate

Adopted: March 21, 2006
 Amended: May 28, 2009
 Amended: May 17, 2012
 Amended: June 27, 2013
 Amended: May 29, 2014
 Amended: October 19, 2017
 Amended: June 24, 2022

ERFC Regulations – Funding Policy and Employer Contribution Rate

(Applicable to ERFC and ERFC 2001)

Pursuant to their authority under §15.03 of the *ERFC* Plan Document and §10.03 of the *ERFC 2001* Plan Document, the Trustees have adopted the following regulations governing determination of the Employer contribution rate and implementation of the funding policy pursuant to §§3.05 and 16.03 of the *ERFC* Plan Document and §§3.05 and 11.03 of the *ERFC 2001* Plan Document.

16.03A Purpose of Regulations. The funding policy of the Plan is stated in §16.03 of the *ERFC* Plan Document and §11.03 of the *ERFC 2001* Plan Document. That policy is “to establish and receive contributions which will remain approximately level from generation to generation of citizens and which, when combined with other assets and investment return thereon, will be sufficient to pay benefits when due, while providing a reasonable margin for adverse experience.” Section 3.05 in each Plan Document provides that the employer “shall contribute a percentage of each Member’s Salary, at a rate to be determined by the actuary in accordance with the funding policy set forth in [this Plan Document].” Within the broader context of the stated funding policy, the objectives of the Trustees are:

- (1) To make consistent progress toward 100% funding of the Plan and to maintain 100% funding once it has been attained,
- (2) to stabilize the Employer contribution rate and avoid sharp increases or decreases due to specific events or short-term conditions; and
- (3) to maintain the Plan’s funding in accordance with actuarial standards of practice that apply to public sector plans and with applicable federal, state, and local laws and regulations.

16.03B Frequency of Actuarial Valuations. The actuary shall prepare annual actuarial valuations based upon calendar-year data. Whenever possible, the valuation for a particular year should be presented to the Trustees within the first 120 days of the following calendar year.

16.03C Schedule for Setting the Employer Contribution Rate. As a general rule, the Trustees will determine the Employer contribution rate biennially, in consultation with the actuary, based upon the actuarial valuation for the most recently completed calendar year, and the rate as so determined will remain in effect for two consecutive Fiscal Years. The rate shall be set and communicated to the Employer at least 9 months in advance of the effective date so that it will be available for use in the Employer’s budgetary process. For example, a rate set in accordance with this biennial schedule based on the actuarial valuation as of December 31, 2015 will become effective July 1, 2017 and will remain in effect through June 30, 2019. Notwithstanding the foregoing, the Trustees may determine the Employer contribution rate annually, in consultation with the actuary, based upon the actuarial valuation for the most recently completed calendar year, if the Trustees determine that the Employer contribution rate should be changed because of changes to the Plan or because of adverse market conditions occurring since the last actuarial valuation. In the event that the rate is determined annually based on this exception, the new rate will be communicated to the Employer at least 9 months in advance of the effective date.

16.03D The Employer Contribution Rate. The Employer contribution rate will be set at a level that is expected to:

- (1) pay all normal costs accruing under the Plan during the Fiscal Years for which the rate is effective; and
- (2) amortize any unfunded liabilities over a reasonable period.

16.03E The Amortization Period for Unfunded Liabilities. In the biennial determination of the Employer contribution rate, the amortization period for unfunded liabilities will be set within the parameters permitted by actuarial standards of practice that apply to public sector plans and by applicable federal, state, or local laws and regulations, and shall, if permitted, be based upon level percent of pay. If those standards, laws, and regulations and the other principles stated in Paragraphs 16.03A and 16.03D permit, the amortization period for unfunded liabilities shall be set with the objective that the Plan will be 100% funded by June 30, 2040. In conjunction with actuarial valuations dated December 31, 2019 and later, the Trustees may elect to create a new 20-year amortization schedule for changes in liabilities arising during that valuation or subsequent valuations, and to continue the amortization of preexisting unfunded liabilities to their scheduled end date. In order to stabilize contributions, the Trustees may from time to time elect to combine separate amortization schedules into a single schedule over the average remaining amortization period then being used. Changes in liabilities associated with benefit changes or assumption changes occurring on or after December 31, 2021 shall be funded over a 20-year period. However, unfunded liabilities arising in conjunction with early retirement incentive programs offered by the Employer after 2013 shall be separately funded over a period not exceeding five future years and shall not be subject to the combining of amortization schedules mentioned elsewhere in this Paragraph 16.03E.

16.03F The Valuation of Plan Assets. The actuarial value of Plan assets shall be determined as a 5-year smoothed market value of assets. The smoothing technique shall fully recognize the assumed return each year. It shall further spread the difference between the actual return and the assumed return in equal installments over the current year and a period of four future years. In the event that the method would result in an actuarial value of assets that is less than 75% of market value or more than 125% of market value, the actuarial value of assets shall be reset to 75% of market value or 125% of market value, as the case may be, and the total difference between market and actuarial value shall be spread over four future years. Based upon consultation with the actuary, the Trustees may combine bases to reset the actuarial value to be equal to the market value when the difference between market value and actuarial value is 5% or less of market value.

16.03G The Valuation of Plan Liabilities. The actuarial liabilities of the Plan shall be determined using the entry age actuarial cost method, and an investment return assumption chosen by the Trustees in conjunction with the Plan actuary and investment consultant. The investment return assumptions shall be based upon the long term expected return on assets, although the Trustees may take other factors into account when determining this assumption. The Trustees shall also adopt other assumptions necessary for the valuation based upon the advice of the actuary and the judgment of the Trustees. The Trustees shall cause a study of actuarial experience under the Plan to be performed at least once in each five-year period and shall adjust all assumptions accordingly as deemed necessary for prudent operation of the Plan.

16.03H Overfunding. In the event that the Plan's assets exceed the Plan's liabilities, all amortization schedules other than those related to any post-2013 early retirement incentive programs offered by the Employer shall be considered completed, and the Employer contribution rate will be set based upon the normal cost and the completion of any remaining amortizations due to post-2013 early retirement

incentive programs offered by the Employer, without regard to such overfunding. In such event, the Trustees shall review the Plan's asset allocation with a view toward de-risking the portfolio and potentially lowering the investment return assumption. Should such de-risking of the portfolio or future unfavorable experiences cause unfunded liabilities to arise again, such liabilities shall be funded over a closed period of 20 future years and shall otherwise be subject to the regulations set forth in Paragraph 16.03E.

Glossary

Glossary

Accrued Service. Service credited under the system which was rendered before the date of the actuarial valuation.

Actuarial Accrued Liability. The difference between the actuarial present value of system benefits and the actuarial present value of future normal costs. Also referred to as “past service liability.”

Actuarial Assumptions. Estimates of future experience with respect to rates of mortality, disability, turnover, retirement, rate or rates of investment return and pay increases. Decrement assumptions (rates of mortality, disability, turnover and retirement) are generally based on past experience, often modified for projected changes in conditions. Economic assumptions (pay increases and investment return) consist of an underlying rate in an inflation-free environment plus a provision for a long-term average rate of inflation.

Actuarial Cost Method. A mathematical budgeting procedure for allocating the dollar amount of the “actuarial present value of future benefits” between future normal costs and actuarial accrued liability. Sometimes referred to as the “actuarial funding method.”

Actuarial Equivalent. One series of payments is said to be actuarially equivalent to another series of payments if the two series have the same actuarial present value.

Actuarial Gain (Loss). The difference between actual unfunded actuarial accrued liabilities and anticipated unfunded actuarial accrued liabilities -- during the period between two valuation dates. It is a measurement of the difference between actual and expected experience.

Actuarial Present Value. The single sum now which is equal to a payment or series of payments in the future. It is determined by discounting future payments at predetermined rates of interest, and by probabilities of payment.

Actuary. A person who is trained in the application of probability and compound interest to problems in business and finance that involve payment of money in the future, contingent upon the occurrence of future events. Most actuaries in the United States are Members of the American Academy of Actuaries. The Society of Actuaries is an international research, education and membership organization for actuaries in the life and health insurance, employee benefits, and pension fields. It administers a series of examinations leading initially to Associateship and the designation ASA, and ultimately to Fellowship with the designation FSA.

Amortization. Paying off an interest-bearing liability with periodic payments as opposed to paying it off with a single sum payment.

Normal Cost. The portion of the actuarial present value of future benefits that is assigned to the current year by the actuarial cost method. Sometimes referred to as “current cost.”

Unfunded Actuarial Accrued Liabilities. The difference between actuarial accrued liabilities and valuation assets (actuarial value of assets). Sometimes referred to as “unfunded past service liability” or simply as “unfunded liability.”

Valuation Assets (Actuarial Value of Assets). The value of plan assets recognized for valuation purposes. This may not be the same value that is used by the plan for financial reporting.