



Actuarial Valuation Report

Educational Employees' Supplementary Retirement System of
Fairfax County

Annual Valuation as of December 31, 2022

Introduction

This report documents the results of the annual actuarial valuation as of December 31, 2022 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.

A valuation model was used to develop the liabilities for this valuation. The valuation model relies on ProVal software, which was developed by Winklevoss Technologies, LLC. Experts within Aon selected this software and determined it is appropriate for performing valuations. We coded and reviewed the software for the provisions, assumptions, methods, and data of the ERFC plan.

The purpose of the valuation was to measure the funding progress of the ERFC plan. Determinations for purposes other than the funding valuation may be significantly different from the results in this report. Thus, the use of this report for purposes other than those expressed here may not be appropriate.

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.



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July 2023

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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, 2021	Valuation Date December 31, 2022
Actuarial (Pension) Liability		
Retired Participants and Beneficiaries Receiving Payment	\$ 2,013,043,362	\$ 2,082,086,209
Terminated Vested Participants	176,715,557	186,295,012
Active Participants	<u>1,731,293,119</u>	<u>1,850,650,132</u>
Total	3,921,052,038	4,119,031,353
Actuarial Value of Assets	<u>(3,058,883,149)</u>	<u>(3,180,603,841)</u>
Unfunded Accrued Liability	\$ 862,168,889	\$ 938,427,512
Funded Ratio		
Actuarial Value of Assets	78.0%	77.2%
Market Value of Assets	87.2%	71.7%
Discount Rate	7.00%	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, 2022 valuation was 16 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. Effective December 31, 2022, the Trustees elected to create a new 20-year closed amortization base for actuarial losses arising in 2022. 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, 2022 valuation was 16 years.

Contribution Rate

Actuarial funding valuations as of even-numbered years (2020, 2022, 2024 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 (2021, 2023, 2025, 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 (2021, 2023, 2025, 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, 2021 valuation were used to set the employer contribution rate of 6.48% for the period July 1, 2023 to June 30, 2025.

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, 2022 valuation was 16 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).

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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, 2022
1. Unfunded Accrued Liability (UAL)	\$ 938,427,512
2. Expected Contribution	
a. January 1 – June 30, 2023	(37,154,887)
b. July 1, 2023 – June 30, 2024	(72,391,404)
3. Interest	<u>94,469,779</u>
4. UAL at June 30, 2024 (1 + 2a + 2b + 3) ¹	\$ 923,351,000
5. Projected Payroll for FY2025	1,905,036,955
6. Amortization Factor	N/A
7. Contribution rate for UAL ¹	4.05%

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 2023 was developed based on the results of the December 31, 2021 valuation.

Valuation Date	December 31, 2021	December 31, 2022
Contribution Rate as a Percent of Member Payroll for period ending June 30	2024 & 2025	N/A
Normal Cost (Current Cost) split by:		
Service Retirement	3.67%	3.64%
Reduced Service Retirement	0.10%	0.09%
Casualty Benefits	0.06%	0.05%
Separation Benefits	1.61%	1.57%
Administrative Expenses	<u>0.25%</u>	<u>0.23%</u>
Total	5.69%	5.58%
Less Member Contribution Rate	<u>(3.00)%</u>	<u>(3.00)%</u>
Employer Normal Cost	2.69%	2.58%
Add Contribution Rate for Unfunded Accrued Liability	<u>3.80%</u>	<u>4.05%</u>
Net Employer Contribution	6.49%	6.63%
Adjustment for ERFC 2001 Tier 2	<u>(0.01)%</u>	<u>(0.01)%</u>
Actuarially Determined Employer Contribution	<u><u>6.48%</u></u>	<u><u>6.62%</u></u>

The Funding Policy contribution for the two-year period beginning July 1, 2023 is determined by the December 31, 2021 valuation. The Board adopted a contribution rate of 6.48% 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. Effective December 31, 2022, the Trustees elected to create a new 20-year closed amortization base for actuarial losses arising in 2022. 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, 2022 valuation was 16 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, 2024.

Date Established	Description	Projected Balance as of 06/30/2024	Remaining Amortization Period	Amortization Factor	Amortization Base
N/A	UAL Prior to 2021	\$ 820,606,072	16	11.64859	\$ 70,446,816
12/31/2020	Assumption Change	(11,846,009)	8	6.76035	(1,752,277)
12/31/2021	Actuarial (Gain)/Loss	(107,155,747)	19	13.10990	(8,173,651)
12/31/2021	Assumption Change	131,114,894	19	13.10990	10,001,212
12/31/2022	Actuarial (Gain)/Loss	<u>90,631,790</u>	20	13.55883	<u>6,684,337</u>
Total		\$ 923,351,000			\$ 77,206,437
	Projected Fiscal 2024 Payroll				\$ 1,905,036,955
	Contribution Rate for Unfunded Actuarial Liability				4.05%

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%	6.48%		6.48%
2025	2022	3.00%	TBD		6.62%

Market Value of Assets

Revenues and Expenditure	Plan Year Ending 12/31/2021	Plan Year Ending 12/31/2022
Fair Value of Assets at Beginning of Measurement Period	\$ 2,984,109,514	\$ 3,419,373,454
Revenue:		
Contributions—Employer	107,493,110	113,688,994
Contributions—Employee	49,480,598	51,038,238
Investment Return:		
Interest and Dividends	31,052,535	29,592,370
Net Appreciation	453,696,587	(444,842,359)
Investment Expense	(6,870,468)	(7,538,665)
Net Securities Lending	<u>377,329</u>	<u>432,577</u>
Total Investment Return	478,255,983	(422,356,077)
Total Revenue	635,229,691	(257,628,845)
Expenditures:		
Refunds of Member Contributions	(4,639,284)	(3,922,253)
Retirement Benefits Paid	(190,909,161)	(197,857,359)
Administrative Expenses	(4,417,306)	(5,322,388)
Depreciation Expense	<u>0</u>	<u>(482,371)</u>
Total Expenditures	(199,965,751)	(207,584,371)
Net Change (Total Revenue less Total Expenditures)	<u>435,263,940</u>	<u>(465,213,216)</u>
Fair Value of Assets at End of Measurement Period	\$ 3,419,373,454	\$ 2,954,160,238

Market Value of Assets

Asset Breakdown	Plan Year Ending 12/31/2021	Plan Year Ending 12/31/2022
Invested Assets		
Bonds	\$ 619,887,798	\$ 540,303,408
Stocks	465,817,116	302,486,876
Real Estate	182,076,367	282,609,322
Hedge Funds - Opportunistic	262,312,643	235,054,026
MACS	259,826,642	126,220,939
Private Equity	312,982,762	303,593,484
Private Debt	17,656,036	52,382,844
Infrastructure	2,373,860	39,420,351
Natural Resources	0	14,391,719
Commingled Funds	<u>1,051,100,036</u>	<u>972,509,871</u>
Total Invested Assets	3,174,033,260	2,868,972,840
Short-term Investments and Cash	198,069,284	179,317,682
Receivables and Pre-Paid Expenses	165,892,524	7,254,268
Other Assets (furniture and equipment)	<u>0</u>	<u>172,914</u>
Total Assets	3,537,995,068	3,055,717,704
Liabilities	<u>(118,621,614)</u>	<u>(101,557,466)</u>
Net Assets	<u>3,419,373,454</u>	<u>2,954,160,238</u>

Portfolio Composition at Market Value	Year Ended December 31			
	2021		2022	
	Value	% of Total	Value	% of
Bonds	\$ 619,887,798	18.1 %	\$ 540,303,408	18.3 %
Stocks	465,817,116	13.6 %	302,486,876	10.2 %
Real Estate	182,076,367	5.3 %	282,609,322	9.6 %
Commingled Funds	1,051,100,036	30.7 %	972,509,871	32.8 %
Hedge Fund of Funds	0	0.0 %	0	0.0 %
Hedge Funds - Opportunistic	262,312,643	7.7 %	235,054,026	8.0 %
MACS	259,826,642	7.6 %	126,220,939	4.3 %
Private Equity	312,982,762	9.2 %	303,593,484	10.3 %
Private Debt	17,656,036	0.5 %	52,382,844	1.8 %
Infrastructure	2,373,860	0.1 %	39,420,351	1.3 %
Natural Resources	0	0.0 %	14,391,719	0.5 %
Net Short-Term Investments and Cash	79,447,670	2.3 %	77,760,216	2.6 %
Receivables, Pre-Paid Expenses and Other	165,892,524	4.9 %	7,427,182	0.3 %
Total Assets	<u>\$ 3,419,373,454</u>	100.0 %	<u>\$2,954,160,238</u>	100.0 %

Actuarial Value of Assets

Year Ended December 31:	2022	2023	2024	2025	2026
A. Actuarial Value Beginning of Year	\$3,058,883,149				
B. Market Value End of Year	2,954,160,238				
C. Market Value Beginning of Year	3,419,373,454				
D. Non-Investment Net Cash Flow	(37,052,380)				
E. Investment Return Assumed Rate:	7.00%	7.00%			
E1. Market Total: B-C-D	(428,160,836)				
E2. Amount for Immediate Recognition	212,824,985				
E3. Amount for Phased-in Recognition: E1-E2	(640,985,823)				
F. Phased-In Recognition of Investment Return:					
F1. Current year: 0.20 x E3	(128,197,165)				
F2. First Prior Year	54,646,089	(128,197,165)			
F3. Second Prior Year	40,785,139	54,646,089	(128,197,165)		
F4. Third Prior Year	40,836,508	40,785,139	54,646,089	(128,197,165)	
F5. Fourth Prior year	(62,122,484)	40,836,508	40,785,139	54,646,089	(128,197,165)
F6. Total Phased-In	(54,051,913)	8,070,571	(32,765,937)	(73,551,076)	(128,197,165)
G. Actuarial Value End of Year:					
G1. Preliminary Actuarial Value End of Year: A+D+E2+F6	3,180,603,841	8,070,571	(32,765,937)	(73,551,076)	(128,197,165)
G2. Upper Corridor Limit: 125% x B	3,692,700,298				
G3. Lower Corridor Limit: 75% x B	2,215,620,179				
G4. Actuarial Value End of Year	3,180,603,841				
H. Actual/Projected Difference Between Market Value and Actuarial Value	(226,443,605)				
I. Market Rate of Return: $E1 / (C + D/2)$	-12.59%				
J. Recognized Rate of Return: $(E2 + F6) / (A + D/2)$	5.22%				
K. Ratio of Actuarial Value to Market Value	107.67%				

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:	2018	2019	2020	2021
A. Actuarial Value Beginning of Year	\$2,398,667,997	\$2,466,004,272	\$2,582,582,541	\$2,786,297,490
B. Market Value End of Year	2,280,734,191	2,628,073,659	2,984,109,514	3,419,373,454
C. Market Value Beginning of Year	2,446,214,825	2,280,734,191	2,628,073,659	2,984,109,514
D. Non-Investment Net Cash Flow	(27,765,155)	(34,382,034)	(33,898,263)	(38,574,737)
E. Investment Return Assumed Rate:	7.25%	7.25%	7.25%	7.25%
E1. Market Total: B-C-D	(137,715,479)	381,721,502	389,934,118	473,838,677
E2. Amount for Immediate Recognition	172,896,943	177,538,961	186,008,422	200,608,234
E3. Amount for Phased-in Recognition: E1-E2	(310,612,422)	204,182,541	203,925,696	273,230,443
F. Phased-in Recognition of Investment Return:				
F1. Current year: 0.20 x E3	(62,122,484)	40,836,508	40,785,139	56,646,089
F2. First Prior Year	36,406,910	(62,122,484)	40,836,508	40,785,139
F3. Second Prior Year	(4,301,284)	36,406,910	(62,122,484)	40,836,508
F4. Third Prior Year	(37,398,310)	(4,301,284)	36,406,910	(62,122,484)
F5. Fourth Prior year	(10,380,345)	(37,398,308)	(4,301,283)	36,406,910
F6. Total Recognized Investment Gain or Loss	(77,795,513)	(26,578,658)	51,604,790	110,552,162
G. Actuarial Value End of Year:				
G1. Preliminary Actuarial Value End of Year: A+D+E2+F6	2,466,004,272	2,582,582,541	2,786,297,490	3,058,883,149
G2. Upper Corridor Limit: 125% x B	2,850,917,739	3,285,092,074	3,730,136,893	4,274,216,818
G3. Lower Corridor Limit: 75% x B	1,710,550,643	1,971,055,244	2,238,082,136	2,564,530,091
G4. Actuarial Value End of Year	2,466,004,272	2,582,582,541	2,786,297,490	3,058,883,149
H. Actual/Projected Difference Between Market Value and Actuarial Value	(185,270,081)	45,491,118	197,812,023	360,490,305
I. Market Rate of Return: E1 / (C + D/2)	(5.66%)	16.86%	14.93%	15.98%
J. Recognized Rate of Return: (E2 + F6) / (A + D/2)	3.99%	6.16%	9.26%	11.25%
K. Ratio of Actuarial Value to Market Value	108.12%	98.27%	93.37%	89.46%

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)							
12/31/2013	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%
12/31/2022	1,790,601	2,082,086	2,036,945	4,119,031	3,180,604	938,427	77.2%

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
12/31/2012	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%
12/31/2022	1,790,601	230%	178%	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
12/31/2018	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
12/31/2022	71.72%	0.51	2.30	0.52	1.65

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 12/31/2021 (\$ millions)	Year Ending 12/31/2022 (\$ millions)
1. Unfunded Accrued Liability (UAL) at Start of Year	\$ 848.9	\$ 862.2
2. Normal Cost	91.1	101.9
3. Member and Employer contributions	(157.0)	(171.9)
4. Interest Accrual	<u>62.5</u>	<u>55.5</u>
5. Expected UAL before changes: (1. + 2. - 3. + 4.)	845.5	847.7
6. Change from non-recurring activities, assumptions and/or benefit changes	<u>133.0</u>	<u>0.0</u>
7. Expected UAL after changes: (5. + 6.)	978.5	847.7
8. Actual UAL at end of year	<u>862.2</u>	<u>938.4</u>
9. Gain/(Loss) (7. - 8.)	\$ 116.3	\$ (90.7)
 Gain (loss) as percent of actuarial accrued liabilities at start of year.	 3.2%	 (2.3)%

Breakdown of Unfunded Liability Gain/Loss

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

(\$ in Millions)	12/31/2021	12/31/2022
Economic Risks		
Pay Increases	\$ 14.9	\$ (23.0)
Investment Return	110.6	(67.5)
Demographic Risk		
Retirement	(14.6)	(3.5)
Mortality	3.4	3.7
Disability	(0.4)	(0.4)
Terminations	4.2	1.6
Data Adjustments and Miscellaneous	<u>(1.8)</u>	<u>(1.6)</u>
Unfunded Accrued Liability Gain/(Loss)	\$ 116.3	\$ (90.7)

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%
2022	(23.0)	(67.5)	(3.5)	3.3	1.6	(1.6)	(90.7)	(2.3)%

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, 2022. 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, 2021	December 31, 2022
Active Participants		
Number	22,329	22,916
Average Age	44.5	44.7
Average Service	9.8	9.7
Average Annual Pay	\$74,468	\$78,138
Inactives With Deferred Benefits		
Number	5,783	6,067
Average Current Age	45.7	45.8
Average Monthly Benefit ¹	\$3,965	\$4,062
Inactives Receiving Payment		
Number	13,338	13,747
Average Current Age	72.7	73.0
Average Monthly Benefit	\$14,318	\$14,304
Total Participants		
Number	41,450	42,730

¹ Before adjustment for assumed retirement age and payment form.

Population Statistics – Exhibit 1

ERFC Legacy Members
WOMEN Active Members in December 31, 2022 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		1	3	5	46			55	5,483,434	99,699
45-49		13	48	50	273	43		427	46,206,584	108,212
50-54	5	22	47	73	289	246	29	711	76,444,787	107,517
55-59		16	42	37	220	92	42	449	45,324,365	100,945
60		3	1	6	36	17	5	68	6,194,748	91,099
61			1	4	41	19	10	75	6,711,660	89,489
62		1	1	2	21	22	8	55	5,098,383	92,698
63			4	5	35	12	2	58	5,171,673	89,167
64		1		1	17	12	4	35	3,220,383	92,011
65		1		3	17	9	3	33	2,888,715	87,537
66				3	11	6	5	25	2,109,873	84,395
67				2	14	7	7	30	2,869,259	95,642
68					15	4	3	22	1,997,344	90,788
69					10	2	1	13	1,061,667	81,667
70					9	4	2	15	1,151,141	76,743
71					1	1	3	5	376,097	75,219
72					2	3	1	6	543,166	90,528
73				1	1		2	4	383,848	95,962
74				1	5		2	8	798,337	99,792
75 & Over					4	1	3	8	699,474	87,434
Totals	5	58	147	193	1,067	500	132	2,102	214,734,936	102,157

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

Age (Years) 55
Service (Years) 22.9
Annual Pay \$ 102,157

Population Statistics – Exhibit 2

ERFC Legacy Members
MEN Active Members in December 31, 2022 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					4			4	341,910	85,478
40-44					101	17	0	128	14,795,333	115,589
45-49	1	1		8	123	126	11	270	31,590,949	117,004
50-54		3	2	5	60	55	11	129	14,008,427	108,592
55-59				3						
60	1	1	1	1	11	6	1	22	2,287,092	103,959
61					7	5	2	14	1,392,658	99,476
62					9	8	4	21	2,032,084	96,766
63					7	5	1	13	1,411,696	108,592
64					7	5	1	13	1,282,557	98,658
65				1	7	1	1	10	1,105,793	110,579
66					3	1	2	6	705,596	117,599
67					1	2	1	4	423,946	105,986
68						1		1	124,017	124,017
69		1						1	86,765	86,765
70					1		1	2	184,647	92,324
71										
72					1		2	3	322,081	107,360
73					1			1	103,798	103,798
74		1						1	104,806	104,806
75 & Over		1			2	2	2	7	748,702	106,957
Totals	2	8	3	18	345	234	40	650	73,052,856	112,389

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

Age (Years) 54.7
Service (Years) 24.9
Annual Pay \$ 112,389

Population Statistics – Exhibit 3

ERFC 2001 Tier 1 Members
WOMEN Active Members in December 31, 2022 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	5	146						151	10,212,008	67,629
30-34	27	918	228					1,173	87,811,984	74,861
35-39	24	496	760	165	1			1,446	120,823,910	83,557
40-44	27	398	442	618	98			1,583	146,375,269	92,467
45-49	25	418	259	335	116			1,153	102,429,897	88,838
50-54	30	439	385	337	89			1,280	107,436,204	83,935
55-59	16	384	351	352	76			1,179	91,238,877	77,387
60	2	58	66	61	23			210	16,047,746	76,418
61	1	47	47	61	22			178	12,913,909	72,550
62	4	32	36	59	15			146	10,841,939	74,260
63	1	26	33	55	27			142	11,351,415	79,940
64		26	40	35	14			115	8,498,744	73,902
65		12	20	33	14			79	6,226,944	78,822
66		11	14	24	8			57	4,330,718	75,978
67		4	13	18	4			39	2,681,304	68,751
68		1	14	15	4			34	2,298,718	67,609
69		2	7	12	4			25	1,753,574	70,143
70		2	3	7				12	1,017,072	84,756
71	1	1	3	3				8	508,984	63,623
72	2	3	5	4	2			16	1,144,421	71,526
73		1	1	4	3			9	557,524	61,947
74		2	2	1	1			6	320,963	53,494
75 & Over		3	1	1	1			6	233,234	38,872
Totals	165	3,430	2,730	2,200	522	0	0	9,047	747,055,357	82,575

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

Age (Years) 46.8
Service (Years) 12
Annual Pay \$ 82,575

Population Statistics – Exhibit 4

ERFC 2001 Tier 1 Members
MEN Active Members in December 31, 2022 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		19						19	1,230,457	64,761
30-34	4	188	44					236	17,524,376	74,256
35-39	2	175	187	47				411	34,007,173	82,743
40-44	4	108	141	215	35			503	47,801,944	95,034
45-49	1	78	73	139	66			357	35,284,358	98,836
50-54	3	65	68	107	52			295	28,861,268	97,835
55-59	3	66	56	80	27			232	22,032,516	94,968
60		9	11	8	3			31	2,889,462	93,208
61		8	6	14	4			32	3,062,637	95,707
62		7	8	16	2			33	3,181,564	96,411
63		8	10	12	2			32	2,957,611	92,425
64		8	7	9	3			27	2,567,289	95,085
65		6	6	4	1			17	1,742,254	102,486
66		2	5	5	1			13	1,139,676	87,667
67	2	4	1	1				8	556,958	69,620
68		3	1	4				8	614,012	76,752
69		5		3	1			9	721,621	80,180
70		3	2	2				7	477,475	68,211
71		2			1			3	299,873	99,958
72			1	1				2	144,614	72,307
73			1					1	39,927	39,927
74			1					1	33,087	33,087
75 & Over		2	1	4				7	641,045	91,578
Totals	19	766	630	671	198	0	0	2,284	207,811,198	90,986

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

Age (Years)	46.3
Service (Years)	12.9
Annual Pay	\$ 90,986

Population Statistics – Exhibit 5

ERFC 2001 Tier 2 Members
WOMEN Active Members in December 31, 2022 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	7							7	190,983	27,283
20-24	577							577	29,362,155	50,888
25-29	1472	158						1,630	96,061,592	58,933
30-34	826	149						975	60,838,427	62,398
35-39	723	84						807	51,637,920	63,988
40-44	761	71						832	53,726,660	64,575
45-49	747	92						839	52,430,057	62,491
50-54	618	81						699	43,187,689	61,785
55-59	388	55						443	27,456,141	61,978
60	56	10						66	4,252,740	64,435
61	43	9						52	3,064,161	58,926
62	30	4						34	1,854,833	54,554
63	28	7						35	2,352,744	67,221
64	23							23	1,353,542	58,850
65	18	1						19	1,201,903	63,258
66	11	3						14	803,828	57,416
67	6	2						8	536,150	67,019
68	5							5	277,497	55,499
69	5							5	217,999	43,600
70	5	1						6	355,820	59,303
71	4							4	293,003	73,251
72	1							1	93,039	93,039
73										
74										
75 & Over	4	1						5	377,811	75,562
Totals	6,358	728	0	0	0	0	0	7,086	431,926,693	60,955

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

Age (Years) 38.8
Service (Years) 2.4
Annual Pay \$ 60,955

Population Statistics – Exhibit 7

**ALL Active Members in December 31, 2022 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	11							11	294,426	26,766
20-24	691							691	34,743,535	50,280
25-29	1827	341						2,168	127,500,560	58,810
30-34	1118	1295	272					2,685	185,031,824	68,913
35-39	954	785	947	212	1			2,899	223,385,579	77,056
40-44	950	603	586	838	183			3,160	267,922,406	84,786
45-49	922	617	380	532	556	60		3,067	263,862,884	86,033
50-54	783	628	502	522	553	372	40	3,400	298,616,888	87,828
55-59	519	531	449	472	383	147	53	2,554	208,930,689	81,805
60	75	82	79	76	73	23	6	414	32,782,509	79,185
61	64	65	54	79	74	24	12	372	28,624,191	76,947
62	46	45	45	77	47	30	12	302	24,264,339	80,345
63	45	42	47	72	71	17	3	297	24,400,828	82,158
64	30	37	47	45	41	17	5	222	17,602,890	79,292
65	26	21	26	41	39	10	4	167	13,847,571	82,920
66	16	16	19	32	23	7	7	120	9,345,972	77,883
67	12	12	14	21	19	9	8	95	7,435,897	78,273
68	8	4	15	19	19	5	3	73	5,414,236	74,168
69	7	8	7	15	15	2	1	55	4,026,582	73,211
70	8	6	5	9	10	4	3	45	3,384,627	75,214
71	7	3	3	3	2	1	3	22	1,622,104	73,732
72	5	3	6	5	5	3	3	30	2,360,006	78,667
73	1	1	2	5	5		2	16	1,147,917	71,745
74		3	3	2	6		2	16	1,257,193	78,575
75 & Over	5	8	2	5	7	3	5	35	2,795,567	79,873
Totals	8,130	5,156	3,510	3,082	2,132	734	172	22,916	1,790,601,219	78,138

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):	54.9	46.7	38.9	44.7
Service (Years)	23.4	12.2	2.3	9.75
Annual Pay	\$ 104,574	\$ 84,270	\$ 62,894	\$ 78,138

Population Statistics – Exhibit 8

Active Members by Years of Service
December 31, 2022

Service Years	Number of Members			Annual Pay (\$)	
	Males	Females	Total	Salary (\$)	Average (\$)
0	506	1955	2,461	135,013,760	54,861
1	393	1465	1,858	112,115,330	60,342
2	232	1027	1,259	81,060,578	64,385
3	239	1061	1,300	84,322,242	64,863
4	232	1020	1,252	85,948,810	68,649
5	203	932	1,135	79,430,169	69,983
6	239	921	1,160	83,538,346	72,016
7	195	915	1,110	81,877,053	73,763
8	155	666	821	63,679,705	77,564
9	148	782	930	73,217,162	78,728
10	160	725	885	72,510,830	81,933
11	158	694	852	71,637,419	84,081
12	120	517	637	54,044,321	84,842
13	83	435	518	44,834,400	86,553
14	112	506	618	55,837,176	90,351
15	128	535	663	59,312,342	89,461
16	130	507	637	58,569,159	91,945
17	159	506	665	62,467,593	93,936
18	153	463	616	60,194,305	97,718
19	119	382	501	51,016,620	101,830
20	106	321	427	42,536,909	99,618
21	119	398	517	53,374,594	103,239
22	124	337	461	47,156,277	102,291
23	113	292	405	42,213,478	104,231
24	81	241	322	34,250,687	106,369
25	56	142	198	21,053,681	106,332
26	44	112	156	17,299,459	110,894
27	41	74	115	13,327,334	115,890
28	47	88	135	15,188,682	112,509
29	46	84	130	14,630,456	112,542
30 & Over	40	132	172	18,942,343	110,130
Totals	4,681	18,235	22,916	1,790,601,219	78,138

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%
12/31/2022	2,752	11,331	8,833	22,916	78,138	4.93%	2.98%	6.50%

Population Statistics – Exhibit 10

Persons in Valuations - Comparative Statement
Retirees and Beneficiaries

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%
12/31/2022	13,747	14,304	196,634,792	1,790,601,219	10.98%

	Average					
	All Retirees			2022 Retirees		
	At Retirement		Current Monthly Benefit	At Retirement		Current Monthly Benefit
	Age	Service		Age	Service	
ERFC Legacy	59.0	23.0	1,327.71	60.5	24.40	1,976.90
ERFC 2001 Tier 1	63.5	11.2	564.20	63.4	13.40	652.75

Population Statistics – Exhibit 11

ERFC Legacy
Original Benefit Formulas (Before July 1, 1988)
Retirees and Beneficiaries December 31, 2022
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	142	3,583,584		3,583,584
Optional Form	8	220,289		220,289
Age and Service - Early:				
Straight Life	138	2,486,795	1,589	2,488,384
Optional Form	9	203,334		203,334
Age and Service Totals	297	6,494,002		6,495,591
Duty Disability				
Straight Life	2	74,079		74,079
Non-Duty Disability				
Straight Life	15	206,657		206,657
Age and Service Survivor				
Beneficiary, Duty Death and Non-Duty Death	26	336,397		336,397
Other Totals	43	617,132		617,132
Total Benefits	340	7,111,134		7,112,723

Population Statistics – Exhibit 12

ERFC Legacy
Benefit Formulas Effective July 1, 1988
Retirees and Beneficiaries December 31, 2022
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	5,615	92,849,367	20,082,344	112,931,711
Optional Form	969	14,869,548	3,662,474	18,532,022
Age and Service - Early:				
Straight Life	3,678	26,190,955	9,423,834	35,614,789
Optional Form	377	2,857,713	843,248	3,700,961
Age and Service Totals	10,639	136,767,583	34,011,900	170,779,483
Duty Disability				
Straight Life	2	10,439	0	10,439
Optional Form	0	0	0	0
Non-Duty Disability				
Straight Life	103	554,244	0	554,244
Optional Form	11	55,966	0	55,966
Age and Service Survivor				
Beneficiary, Duty Death and Non-Duty Death	201	1,498,371	153,759	1,652,130
Other Totals	317	2,119,020	153,759	2,272,779
Total Benefits	10,956	138,886,604	34,165,659	173,052,262

Population Statistics – Exhibit 13

ERFC 2001 Tier 1
Retirees and Beneficiaries December 31, 2022
by Type of Benefit Being Paid

Type of Pension Being Paid	No.	Payable For Life	Temporary Supplement	Annual Current Benefits
Age and Service - Normal:				
Straight Life	1934	13,080,241	0	13,080,241
Optional Form	480	3,299,485	0	3,299,485
Age and Service - Early:				
Straight Life	0	0	0	0
Optional Form	0	0	0	0
Age and Service Totals	2,414	16,379,726	0	16,379,726
Duty Disability				
Straight Life	0	0	0	0
Optional Form				0
Non-Duty Disability				
Straight Life	0	0	0	0
Optional Form	0	0	0	0
Age and Service Survivor Beneficiary, Duty Death and Non-Duty Death	37	214,406	0	0
Other Totals	37	214,406	0	214,406
Total Benefits	2,451	16,594,132	0	16,594,132

Population Statistics – Exhibit 14

ERFC Legacy
Original Benefit Formulas (Before July 1, 1988)
Retirees and Beneficiaries December 31, 2022
Current Annual Benefits - Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
69	2	\$20,082
70	1	1,417
71	2	13,982
72	1	20,802
74	2	27,735
76	1	40,177
77	3	62,198
78	2	27,276
79	1	15,645
80-84	32	523,131
85-89	143	3,604,369
90 & Up	150	2,755,910
Total	340	7,112,723

Population Statistics – Exhibit 15

ERFC Legacy
Benefit Formulas Effective July 1, 1988
Retirees and Beneficiaries December 31, 2022
Current Annual Benefits - Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
Under 40	1	\$3,589
40-44	1	2,713
45	2	7,184
46	3	10,715
48	3	39,097
49	2	62,958
50	4	92,824
51	5	117,695
52	14	489,205
53	17	499,009
54	23	876,118
55	58	1,663,513
56	88	2,580,523
57	90	2,684,650
58	132	3,905,657
59	154	4,126,695
60	167	5,038,291
61	168	4,562,207
62	200	5,342,065
63	204	5,838,745
64	275	7,519,496
65	333	9,365,120
66	350	5,842,061
67	362	4,046,697
68	442	4,812,287
69	424	4,677,044
70-74	2,722	32,684,153
75-79	2,490	33,816,929
80 & Up	2,222	32,153,640
Total	10,956	172,860,882

Population Statistics – Exhibit 16

ERFC 2001 Tier 1
Retirees and Beneficiaries December 31, 2022
Current Annual Benefits - Tabulated by Attained Ages

Attained Ages	No.	Annual Amount
Under 40	1	\$1,240
40-44	0	0
49	1	6,667
52	1	4,179
53	1	10,496
55	1	3,891
56	1	14,584
58	3	12,357
59	1	7,555
60	85	575,158
61	123	846,149
62	136	909,654
63	134	925,234
64	119	843,567
65	185	1,413,754
66	181	1,214,239
67	176	1,318,935
68	185	1,374,227
69	183	1,241,700
70-74	654	4,287,547
75-79	234	1,372,959
80 & Up	46	210,040
Total	2,451	16,594,132

Population Statistics – Exhibit 17

ERFC Legacy
Original Benefit Formulas (Before July 1, 1988)
Inactive Vested Members December 31, 2022
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, 2022
Annual Deferred Benefits – Tabulated by Attained Ages

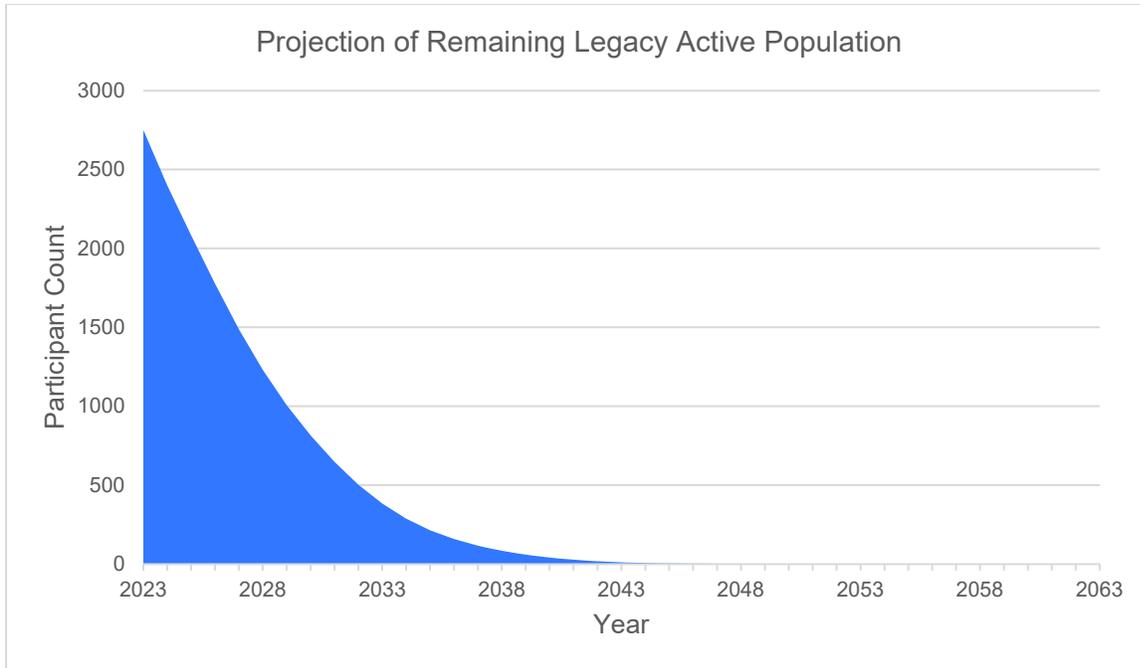
Attained Ages	No.	Annual Amount
43	2	\$10,277
44	38	155,300
45	49	136,042
46	62	162,499
47	65	179,367
48	96	236,564
49	94	315,242
50	94	255,520
51	111	382,653
52	113	340,461
53	98	295,199
54	97	569,268
55	80	300,818
56	65	241,604
57	54	251,486
58	43	138,354
59	37	229,209
60	30	117,688
61	27	162,721
62	28	161,990
63	26	155,682
64	17	75,786
65 & Up	67	165,488
Total	1,393	5,039,218

Population Statistics – Exhibit 19

ERFC 2001 Tier 1
Inactive Vested Members December 31, 2022
Annual Deferred Benefits – Tabulated by Attained Ages

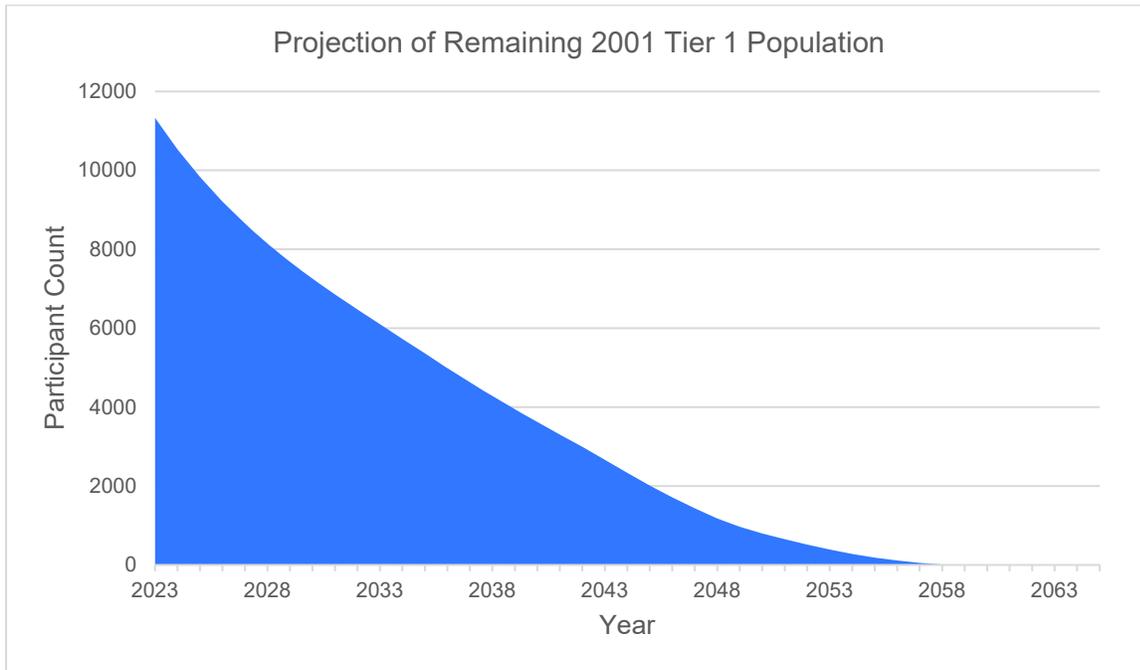
Attained Ages	No.	Annual Amount
27	8	\$20,479
29	45	121,224
30	61	167,752
31	83	247,302
32	147	468,284
33	171	547,401
34	175	584,034
35	208	750,073
36	220	769,295
37	206	775,233
38	215	831,843
39	245	1,011,528
40	236	962,311
41	257	1,010,652
42	251	1,117,994
43	256	1,150,649
44	200	866,730
45	154	662,625
46	121	557,895
47	127	652,041
48	102	529,804
49	95	451,179
50	77	421,423
51	102	468,961
52	82	360,731
53	78	424,100
54	75	410,774
55	79	426,208
56	74	378,916
57	83	478,400
58	94	482,007
59	93	483,943
60	55	228,417
61	34	154,604
62	30	108,311
63	15	71,226
64	16	60,658
65 & Up	30	93,838
Total	4,600	19,308,841

Expected Development of ERFC Legacy Present Population December 31, 2022



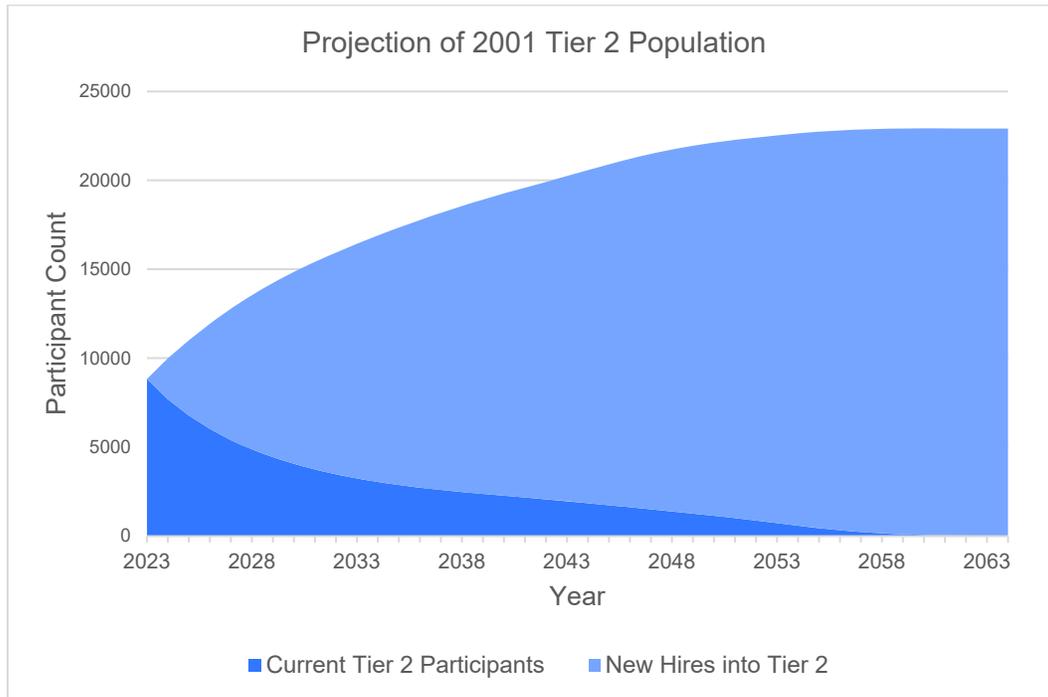
ERFC Legacy is a closed group that presently covers 2,752 active members. Approximately 99% of the present population is expected to receive monthly retirement benefits either by retiring directly from active service, or by separating from service without withdrawing contributions. Within 5 years, over half of the current membership will have left the group.

Expected Development of ERFC 2001 Tier 1 December 31, 2022



ERFC 2001 Tier 1 is a closed group that presently covers 11,331 active members. Within 12 years, over half of the current membership will have left the group.

Expected Development of ERFC 2001 Tier 2 December 31, 2022



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, 2022 level. The projection of the current ERFC Tier 2 population of 8,833 participants is shown separately from future new hires.

Actuarial Assumptions and Methods

Investment Return Rate	7.00%
Salary Increases	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 2.75% 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	<p>Members hired prior to July 1, 2017: 3.00% (actual COLA).</p> <p>Members hired on/after July 1, 2017: 2.25% (long-term estimate of provision of 100% of CPI-U capped at 4.00%).</p>
Actuarial Value of Assets	<p>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.</p>
Incidence of Contributions	<p>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.</p>
Amortization Basis for Funding	<p>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. Effective December 31, 2022, the Trustees elected to create a new 20-year closed amortization base for actuarial losses arising in 2022. 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, 2022 valuation was 16 years.</p>
Actuarial Equivalence Factors (as of the date of this report):	<p>The interest rate is 7.00% for the Option D form of payment. For Small Pension payouts the interest rate is the lesser of 7.00% 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.</p>

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, 2022
Measurement Period	December 31, 2021 to December 31, 2022
Valuation Date	December 31, 2022
Census Data	As of December 31, 2021, and December 31, 2022.

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

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

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

There were no plan changes during the year.

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

There were no plan changes during the year.

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.