



August 24, 2020

Ms. Bethany Rhodes, Director
Ohio Retirement Study Council
Rhodes State Office Tower
30 East Broad Street, 2nd Floor
Columbus, OH 43215

Dear Ms. Rhodes:

In accordance with Ohio Revised Code Section 5505.12(A), I am attaching the actuarial valuation of the Highway Patrol Retirement System as of December 31, 2019.

If you have any questions, please contact me.

Sincerely,

Carl Roark, Ph.D.
Executive Director
direct dial 614.430.3557
c.roark@ohprs.org

cc: The Honorable Mike DeWine, Governor
The Ohio Retirement Study Council
Director Kimberly Murnieks, Office of Budget and Management
The Honorable Bob Cupp, Speaker of the House
The Honorable Larry Obhof, Senate President
The Honorable Kirk Schuring, Chair, Ohio Retirement Study Council
The Honorable Tim Ginter, Chair, House Aging & Long-Term Care
The Honorable Nathan Manning, Chair, Senate Local Government, Public Safety
& Veterans Affairs

OHIO STATE HIGHWAY PATROL RETIREMENT SYSTEM

ACTUARIAL VALUATION
AS OF DECEMBER 31, 2019



FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

August 5, 2020

Board of Trustees
Ohio State Highway Patrol Retirement System
Columbus, Ohio

Dear Board:

We are pleased to present to the Board this report of the December 31, 2019 actuarial valuation of the Ohio State Highway Patrol Retirement System (OHPRS or the System).

The valuation was performed as of December 31, 2019 to determine the current funding status, funding period, the experience of the System over the past year, and provide information and trend data schedules for use in the Comprehensive Annual Financial Report (CAFR). Use of the results for other purposes may not be applicable and produce significantly different results. Successive valuations will be performed every year.

This report does not include the related results for GASB Statements No. 67 and No. 68. Foster & Foster provided the disclosure information under Statements No. 67 and No. 68 in a separate report dated June 16, 2020. Foster & Foster prepares a separate valuation of OHPRS retiree health care benefits.

Data Sources

In preparing this report, we have relied on personnel, plan design and asset information supplied by OHPRS. In our opinion, the assumptions used in the valuation, as adopted by the Board of Trustees, represent reasonable expectations of anticipated fund experience. While we cannot verify the accuracy of all this 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 of the information and believe that it has produced appropriate results. This information, along with any adjustments or modifications, is summarized in various sections of this report.

Experience

The experience of the System over the last year is outlined in this report. The System experienced an actuarial loss of \$1.0 million, which consists of a \$0.15 million loss on the Fund's actuarial value of assets and a \$0.85 million loss on the System's actuarial accrued liability. Based on the actuarial value of assets, the Fund earned 7.20% compared to the assumed 7.25% return. The primary source of liability loss was due to inactive mortality experience and an average salary increase of 6.9% which exceeded the 5.3% assumption. The loss was offset by the effect of the favorable retirement and withdrawal experience. Offsetting the increases, the actuarial accrued liability decreased by \$14.29 million attributable to the assumption changes as a result of our actuarial experience study performed in May 2020.

Changes Since Prior Report

This is the first valuation completed by Foster & Foster. Information contained in this report for plan years on or prior to December 31, 2018 is based upon valuations performed by the prior actuary. As part of the transition work, we replicated the December 31, 2018 actuarial valuation to ensure that we have properly programmed our valuation software to reflect the plan provisions and assumptions. Based on the results of our replication, the December 31, 2018 actuarial accrued liability decreased by approximately 0.48%, which is within the acceptable corridor.

The Board of Trustees adopted changes to the following Plan assumptions in conjunction with the December 31, 2019 valuation:

- Salary Increase
- Retirement Rates
- Withdrawal Rates
- Disability Rates
- Mortality Rates
- Marriage Percentage
- DROP election
- Administrative Expense assumption
- Payroll Growth Rate

Specific changes to the above assumptions are disclosed in the Actuarial Assumptions and Methods section of this report.

Contribution Amounts

As established by Ohio Revised Code Section 5505.15, the Statutory Employer and Employee contribution rates are set as follows:

Annual Contributions to the Fund (as a % of Active Payroll)		
Employer	Employee	Totals
26.50%	10.00% to 14.00%	36.50% to 40.50%

The funding objective of the Fund is to comply with the amortization requirement of Section 5505.121 of the Revised Code, which requires the retirement board to set a policy with a period of not more than thirty years to amortize the system's unfunded actuarial accrued pension liabilities. If the funding period exceeds 30 years, a plan shall be prepared and submitted by the Board of Trustees to the Ohio retirement study commission (ORSC) to reduce the funding period to not more than 30 years. With the enactment of Senate Bill 345, the Board has the discretion to set the member contribution rate and the Cost of Living Allowance (COLA) percentage to comply with the amortization requirement of Section 5505.121 of the Revised Code.

The results presented in this report are based upon the Board decision to adopt a member contribution rate of 14.0% and a COLA rate of 0.0% beginning in calendar year 2020 and thereafter. The purpose of this report is to provide information on the results of the December 31, 2019 actuarial valuation based upon these decisions.

Based on the results of this valuation, the unfunded actuarial accrued liabilities of the pension program are expected to be amortized over a 23-year period, so no 30-year funding plan is required.

Schedules for CAFR

The report includes information and trend data schedules for use in the Comprehensive Annual Financial Report (CAFR). The following information and exhibits are included in the body of the report and Supplementary Tables section:

- Present Value of Future Benefits
- Membership Note Data
- Participant Statistics
- History of Change in Unfunded Accrued Liability
- History of Annuitants and Survivors Added/Dropped from Rolls
- Summary of Annuitants and Survivors by Age
- Breakdown of Aggregate Accrued Liabilities
- Expected Development of Members contributing to the System

Actuarial Certification

The valuations have 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, and reflects laws and regulations issued to date pursuant to the provisions of Chapter 5505 of the Ohio Revised Code, as amended by Senate Bill No. 345., as well as applicable federal laws and regulations. Future actuarial measurements may differ significantly from the current measurements presented in this report for a variety of reasons including changes in applicable laws, changes in plan provisions, changes in assumptions, or plan experience differing from expectations. Due to the limited scope of the valuation, we did not perform an analysis of the potential range of such future measurements.

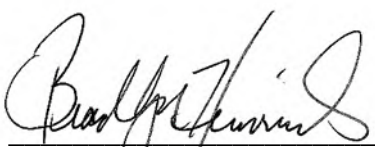
In our opinion, the following valuation results fairly present the financial condition of the Ohio State Highway Patrol Retirement System as of December 31, 2019.

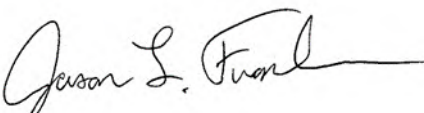
The undersigned is familiar with the immediate and long-term aspects of pension valuations and meets the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. All the sections of this report are considered an integral part of the actuarial opinions.

To our knowledge, no associate of Foster & Foster, Inc. working on this report has any direct financial interest or indirect material interest in the Ohio State Highway Patrol Retirement System, nor does anyone at Foster & Foster, Inc. act as a member of the Board of Trustees of the Ohio State Highway Patrol Retirement System. Thus, there is no relationship existing that might affect our capacity to prepare and certify this actuarial report.

We look forward to discussing the results with you.

Regards,

By: 
Bradley R. Heinrichs, FSA, EA, MAAA

By: 
Jason L. Franken, FSA, EA, MAAA

Foster & Foster, Inc.

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SUMMARY OF RESULTS

The table below contains a summary of key valuation results compared to the prior year values.

	December 31, 2019	December 31, 2018
Membership Data		
Active Members (Includes DROP members)		
Number	1,614	1,668
Covered Payroll	118,370,595	116,009,622
Valuation Payroll	122,942,091	120,243,973
Retirees and Beneficiaries		
Number	1,699	1,671
Annual Allowances	\$ 69,831,187	\$ 67,722,984
Vested Former Members		
Number	18	17
Deferred Annual Allowances	\$ 569,612	\$ 545,670
Inactive Members eligible for Refunds only		
Number	574	532
Contributions Refund Due	\$ 2,979,402	\$ 2,477,847
Funded Status		
Total Actuarial Liability	\$ 1,173,155,313	\$ 1,158,179,566
Actuarial Value of Assets	<u>796,284,462</u>	<u>769,097,204</u>
Unfunded Actuarial Liability	\$ 376,870,851	\$ 389,082,362
Funded Ratio	67.9%	66.4%
Market Value of Assets	\$ 817,859,488	\$ 715,480,960
Unfunded Liability (MVA basis)	\$ 355,295,825	\$ 442,698,606
Funded Ratio (MVA basis)	69.7%	61.8%
Funding Period on AVA basis	23 Years	23 Years
Contribution Rates (as a Percentage of Payroll)		
Applicable Fiscal Year	2020	2019
Statutory Contribution Rates:		
Employer	26.50%	26.50%
Member	<u>14.00%</u>	<u>12.50%</u>
Totals	40.50%	39.00%
Allocation of Employer Contribution Rate:		
Pension Contribution Rate:		
Employer Normal Cost	6.18%	6.04%
Unfunded Actuarial Accrued Liabilities	<u>20.32%</u>	<u>20.46%</u>
Total Employer Pension Rate	26.50%	26.50%
Health Care Contribution Rate	<u>0.00%</u>	<u>0.00%</u>
Total Employer Contribution Rate	26.50%	26.50%

ACTUARIAL LIABILITY AND FUNDED RATIO

Below are details regarding the actuarial liability and funded ratio as of December 31, 2019.

1.	Present Value of Future Benefits	\$	1,358,229,964
2.	Active Members Actuarial Liability		
	Retirement	\$	430,167,351
	Termination		13,312,733
	Death & Disability		<u>7,243,809</u>
	Total	\$	450,723,893
3.	Members Receiving Benefits		
	Retirement Annuities	\$	617,386,628
	Disability Annuities		58,623,205
	Survivor Annuities/Children		<u>38,266,085</u>
	Total	\$	714,275,918
4.	Vested Former Members	\$	5,176,100
5.	Contributions Refund Due	\$	2,979,402
6.	Total Actuarial Liability	\$	1,173,155,313
7.	Actuarial Value of Assets	\$	796,284,462
8.	Unfunded Actuarial Liability	\$	376,870,851
9.	Funded Ratio		67.9%

EMPLOYER'S NORMAL COST

Below is a summary of the employer's share of the normal cost for the year beginning January 1, 2020.

Normal Cost	Normal Cost	Percent of Total Payroll
Retirement	\$ 17,600,774	14.32%
Termination	1,808,277	1.47%
Death & Disability	2,100,519	1.71%
Total Normal Cost as of beginning of year	\$ 21,509,570	17.50%
Total Normal Cost (with interest)	\$ 22,289,292	18.13%
Expected Member Contributions	\$ 17,211,893	14.00%
Employer's share of Normal Cost	\$ 5,077,399	4.13%
Expected Administrative Expenses (with interest)	\$ 1,598,814	1.30%
Purchase of Military Service	\$ 922,066	0.75%
Employer's share of Normal Cost, adjusted for expected administrative expenses and purchase of military service	\$ 7,598,279	6.18%
Unfunded Actuarial Accrued Liabilities Amortization Rate		20.32%
Pension Employer Contribution Rate		26.50%
Valuation Payroll	\$ 122,942,091	

UNFUNDED ACTUARIAL LIABILITY

1. Unfunded Actuarial Accrued Liability (UAAL) as of December 31, 2018	\$	389,082,362
2. Total Normal Cost, Developed as of December 31, 2018		23,248,328
3. Expected Interest (7.25%) on 1. and 2.		29,893,975
4. Contributions		49,359,784
5. Expected Interest (7.25%, mid-year) on 4.		1,757,986
6. Expected UAAL as of December 31, 2019 (1)+(2)+(3)-(4)-(5)		391,106,895
7. Change in UAAL due to actuarial (gain)/loss, by component		
Increase in UAAL due to investment return lower than assumed		154,476
Increase in UAAL due to salary increases higher than assumed		1,711,714
Decrease in UAAL due to decrement experience		(7,319,472)
Increase in UAAL due to inactive mortality experience		5,696,925
Increase in UAAL due to other changes		<u>772,615</u>
Net increase in UAAL due to actuarial experience		1,016,258
8. Change in UAAL due to assumption changes		(14,293,504)
9. Change in UAAL due to the change in actuary		(958,798)
10. Unfunded Actuarial Accrued Liability as of December 31, 2019	\$	376,870,851

CHANGE IN FUNDED RATIO

1. Funded ratio as of December 31, 2018	66.4%
2. Expected funded ratio as of December 31, 2019	67.1%
3. Change in funded ratio due to actuarial (gain)/loss, by component	
Decrease in funded ratio due to investment return lower than assumed	0.0%
Decrease in funded ratio due to salary increases higher than assumed	-0.1%
Increase in funded ratio due to decrement experience	0.4%
Decrease in funded ratio due to inactive mortality experience	-0.4%
Decrease in funded ratio due to other changes	<u>0.0%</u>
Net decrease in funded ratio due to actuarial experience	-0.1%
4. Change in UAAL due to assumption changes	0.8%
5. Change in UAAL due to the change in actuary	0.1%
6. Funded Ratio as of December 31, 2019	67.9%

UNFUNDED ACTUARIAL ACCRUED LIABILITY

FUNDING PERIOD

Below is the schedule illustrating the Amortization of the Total Unfunded Actuarial Accrued Liability as of December 31, 2019.

Year	Projected Unfunded Actuarial Accrued Liability at Beginning of the Year	Assumed Amortization Contribution Rate ¹	Assumed Payroll 3.00% Growth Rate	Mid-Year Amortization Contribution Amount	Projected Unfunded Actuarial Accrued Liability at End of the Year
1	\$ 376,870,851	20.32%	\$ 122,942,091	\$ 24,981,266	\$ 378,322,995
2	378,322,995	20.40%	126,630,354	25,832,592	378,998,773
3	378,998,773	20.48%	130,429,265	26,711,913	378,812,906
4	378,812,906	20.60%	134,342,143	27,674,481	377,616,713
5	377,616,713	20.75%	138,372,407	28,712,274	375,259,041
6	375,259,041	20.90%	142,523,579	29,787,428	371,616,992
7	371,616,992	20.97%	146,799,286	30,783,810	366,679,025
8	366,679,025	21.02%	151,203,265	31,782,926	360,348,355
9	360,348,355	21.07%	155,739,363	32,814,284	352,490,621
10	352,490,621	21.10%	160,411,544	33,846,836	342,993,874
11	342,993,874	21.12%	165,223,890	34,895,286	331,722,822
12	331,722,822	21.14%	170,180,607	35,976,180	318,515,228
13	318,515,228	21.14%	175,286,025	37,055,466	303,232,357
14	303,232,357	21.15%	180,544,606	38,185,184	285,671,525
15	285,671,525	21.16%	185,960,944	39,349,336	265,631,918
16	265,631,918	21.15%	191,539,772	40,510,662	242,936,752
17	242,936,752	21.15%	197,285,965	41,725,982	217,337,582
18	217,337,582	21.13%	203,204,544	42,937,120	188,628,199
19	188,628,199	21.12%	209,300,680	44,204,304	156,525,070
20	156,525,070	21.09%	215,579,700	45,465,759	120,788,081
21	120,788,081	21.07%	222,047,091	46,785,322	81,093,600
22	81,093,600	21.03%	228,708,504	48,097,398	37,162,463
23	37,162,463	20.98%	235,569,759	38,486,032	0

Funding Period = 23 Years

1. The amortization contribution rate is the total statutory contribution rate, minus the total normal cost rate, minus the health care contribution rate. The statutory contribution rate is assumed to remain unchanged except for any legislated increases. The administrative expense is projected to increase at the assumed inflation rate of 2.50% per year. The impact of House Bill 362 and changes adopted by OHPRS that will impact new members will reduce the total normal cost rate over time, and, thus, increase the amortization contribution rate, as reflected above.

DEVELOPMENT OF ASSETS

Development of Investment Gain/(Loss)

Market Value of Assets, 12/31/2018	\$ 817,308,534
Contributions Less Benefit Payments & Admin Expenses	(36,271,453)
Expected Investment Earnings for 2019	<u>57,940,029</u>
Expected Market Value of Assets, 12/31/2019	\$ 838,977,110
Actual Net Investment Income/(Loss) for 2019	\$ 147,808,785
2019 Investment Gain/(Loss), (Actual less Expected)	\$ 89,868,756

Development of Actuarial Value of Assets

Plan Year Ending	Gain/(Loss)	Gains/(Losses) Not Yet Recognized by Valuation Year		
		2019	2020	2021
12/31/2016	(12,592,021)	0	0	0
12/31/2017	49,993,408	12,498,352	0	0
12/31/2018	(110,794,174)	(55,397,087)	(27,698,543)	0
12/31/2019	89,868,756	<u>67,401,567</u>	<u>44,934,378</u>	<u>22,467,189</u>
Total		24,502,832	17,235,835	22,467,189

Market Value of Assets, 12/31/2019	\$ 928,845,866
Less: Unrecognized Amounts as of 12/31/2019	<u>24,502,832</u>
Preliminary Actuarial Value of Assets, 12/31/2019	\$ 904,343,034
Corridor Percent	20%
Upper Corridor Limit	1,114,615,039
Lower Corridor Limit	743,076,693
Actuarial Value of Assets, 12/31/2019	\$ 904,343,034

Calculation of Rates of Return

Rates of return calculated below are based on a formula defined by the IRS. Therefore, the returns may differ from investment returns calculated for other purposes. The formula is defined as $(2 * I)$ divided by $(A + B - I)$ where A, B and I are as follows:

(A) 12/31/2018 Actuarial Assets:	\$ 878,555,466
(I) Net Investment Income:	
1. Interest, Dividends, & Realized/Unrealized Gain/Loss (net of investment expenses)	147,808,785
2. Change in Actuarial Value	<u>(85,749,764)</u>
Total	\$ 62,059,021
(B) 12/31/2019 Actuarial Assets:	\$ 904,343,034
Actuarial Asset Rate of Return = $2I/(A+B-I)$:	7.2%
Market Value of Assets Rate of Return:	18.5%
12/31/2019 Limited Actuarial Assets:	904,343,034

STATEMENT OF FIDUCIARY NET POSITION
 December 31, 2019

	MARKET VALUE		
	PENSION	HEALTH	TOTAL
<u>ASSETS</u>			
Cash and Cash Equivalents:			
Cash and Short Term Investments	20,782,052	2,885,015	23,667,067
Total Cash and Equivalents	20,782,052	2,885,015	23,667,067
Receivables:			
Employer Contributions Receivable	2,133,669	0	2,133,669
Member Contributions Receivable	1,499,104	0	1,499,104
Accrued Investment Income	847,830	117,698	965,528
Total Receivables	4,480,603	117,698	4,598,301
Investments:			
Domestic Equity	274,878,455	37,675,276	312,553,731
International Equity	151,469,142	20,748,429	172,217,571
Fixed Income	140,112,205	19,193,104	159,305,309
Real Estate	58,400,615	7,999,939	66,400,554
Private Equity	106,588,264	14,600,867	121,189,131
Hedge Funds	61,201,154	8,383,567	69,584,721
Direct Infrastructure	6,397,963	876,417	7,274,380
Total Investments	799,047,798	109,477,599	908,525,397
Other	27,856	1,131	28,987
Total Assets	<u>824,338,309</u>	<u>112,481,443</u>	<u>936,819,752</u>
Deferred Outflows of Resources	400,615	48,815	449,430
<u>LIABILITIES</u>			
Payables:			
Accounts Payable	509,405	70,717	580,122
Accrued Payroll Liabilities	289,629	40,207	329,836
Accrued Pension Liabilities	4,772,146	0	4,772,146
Accrued Health Care Liabilities	0	808,109	808,109
Net Pension Liability	1,239,854	0	1,239,854
Net OPEB Liability	0	617,465	617,465
Total Liabilities	<u>6,811,034</u>	<u>1,536,498</u>	<u>8,347,532</u>
Deferred Inflows of Resources	68,402	7,382	75,784
Net Assets:			
Active and Retired Members' Equity	817,859,488	110,986,378	928,845,866
Employees' Savings Fund			89,911,182
Employer Accumulation Fund			110,986,378
Pension Reserve Fund			727,948,306
Survivors Benefit Fund			0
Health Care Fund			110,986,378
Income Fund			(110,986,378)
Total Fund Balance			928,845,866
NET POSITION			928,845,866

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION
 FOR THE YEAR ENDED December 31, 2019
 Market Value Basis

	<u>PENSION</u>	<u>HEALTH</u>	<u>TOTAL</u>
<u>ADDITIONS</u>			
Contributions:			
Member Contribution	15,618,020	4,006,980	19,625,000
Employer Contributions	33,107,047	0	33,107,047
Medicare Part D Reimbursement		2,983,659	2,983,659
Transfers	634,717		634,717
Total Contributions	49,359,784	6,990,639	56,350,423
Net Investment Income ¹	129,802,232	18,006,553	147,808,785
Total Additions	179,162,016	24,997,192	204,159,208
<u>DEDUCTIONS</u>			
Distributions to Members:			
Benefit Payments	73,497,433	15,609,344	89,106,777
Refund of Member Contributions	1,556,151		1,556,151
Death Benefit	80,000		80,000
Total Distributions	75,133,584	15,609,344	90,742,928
Administrative Expenses	1,649,904	229,044	1,878,948
Total Deductions	76,783,488	15,838,388	92,621,876
Net Increase in Net Position	102,378,528	9,158,804	111,537,332
NET POSITION			
Beginning of the Year	715,480,960	101,827,574	817,308,534
End of the Year	817,859,488	110,986,378	928,845,866
Actuarial Value End of Year ²	796,284,462	108,058,572	904,343,034

¹Investment related expenses include investment management, investment consulting, custodial and securities lending bank fees.

²Actuarial Value is allocated in proportion to the Market Value

PARTICIPANT DATA

Participant Information	December 31, 2019	December 31, 2018	Change
Number Total Active Members	1,614	1,668	-3.2%
Number Active DROP Members	167	154	8.4%
Number Receiving Benefits			
Retirement Annuities	1,275	1,248	2.2%
Surviving Annuities	280	282	-0.7%
Disability Annuities	144	141	2.1%
Number Inactive Members - Vested	18	17	5.9%
Total Members	3,331	3,356	-0.7%
Active Statistics – Total			
Number	1,614	1,668	-3.2%
Average Age	38.8	38.2	1.6%
Average Service	13.5	13.3	1.4%
Covered Payroll	\$ 118,370,595	\$ 116,009,622	2.0%
Average Payroll	\$ 73,340	\$ 69,550	5.4%
Active Statistics – DROP Members			
Number	167	154	8.4%
Average Age	52.4	52.0	0.8%
Average Service	27.1	27.7	-2.0%
Average Age at DROP	49.8	49.8	0.0%
Average Service at DROP	24.6	24.6	-0.1%
Covered Payroll	\$ 14,840,214	\$ 13,314,696	11.5%
Average Payroll	\$ 88,864	\$ 86,459	2.8%
Annual Benefit Payments for Members			
Receiving Benefits			
Retirement Annuities	\$ 59,695,768	\$ 57,774,840	3.3%
Surviving Annuities	\$ 4,909,832	\$ 4,870,164	0.8%
Disability Annuities	\$ 5,225,587	\$ 5,077,980	2.9%

Participant Reconciliation

	Active	Active DROP	Inactive Vested	Retiree	Survivors	Disabled	Total Count
<i>As of 12/31/2018</i>	1,514	154	17	1,248	282	141	3,356
DROPs In	(39)	39					0
Terminations							
Vested	(3)		3				0
Not Vested	(51)						(51)
Retirements	(15)	(25)	(3)	43			0
Disabled	(3)					3	0
Deaths							
w/o Beneficiary				(5)	(12)		(17)
w/ Beneficiary	(1)	(1)		(10)	16		4
New Member	42						42
Return to Work	3					(1)	2
Benefit Expired					(6)		(6)
Adjustments	<u>0</u>	<u>0</u>	<u>1</u>	<u>(1)</u>	<u>0</u>	<u>1</u>	<u>1</u>
Net Change	(67)	13	1	27	(2)	3	(25)
<i>As of 12/31/2019</i>	1,447	167	18	1,275	280	144	3,331

Active Member Statistics

DROP Status	Sex	Count	Avg Age	Avg Svc	Covered Payroll	
					Total	Average
Not Yet in DROP	M	1,310	37.3	12.0	94,282,617	71,971
	F	<u>137</u>	36.4	10.8	<u>9,247,763</u>	67,502
	Total	1,447	37.2	11.9	103,530,381	71,548
In DROP	M	156	52.4	27.2	13,893,803	89,063
	F	<u>11</u>	53.0	25.9	<u>946,412</u>	86,037
	Total	167	52.4	27.1	14,840,214	88,864
Total	M	1,466	38.9	13.7	108,176,420	73,790
	F	<u>148</u>	37.7	11.9	<u>10,194,175</u>	68,880
	Total	1,614	38.8	13.5	118,370,595	73,340

Active Age Service Grid - Total

Total Active Member Count and Covered Payroll by Age and Service

Age	Years of Service								Total	
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34		35+
<25	18	84								102
	\$33,293	\$51,473								\$48,265
25-29	13	195	72							280
	\$34,018	\$58,331	\$68,144							\$59,725
30-34	5	51	147	17						220
	\$37,605	\$58,072	\$70,240	\$77,123						\$67,210
35-39		21	55	84	65	2				227
		\$59,781	\$69,702	\$76,442	\$79,429	\$85,961				\$74,207
40-44		1	15	44	135	94	2			291
		\$78,471	\$69,958	\$75,390	\$80,918	\$83,920	\$92,426			\$80,558
45-49			2	18	63	125	95			303
			\$71,816	\$75,028	\$75,629	\$84,459	\$87,791			\$83,024
50-54				1	24	31	81	17		154
				\$85,309	\$74,870	\$81,747	\$87,397	\$103,457		\$86,067
55-59					1	8	14	14		37
					\$72,592	\$80,191	\$83,605	\$96,851		\$87,581
60-64										
65-69										
70+										
Total	36	352	291	164	288	260	192	31		1,614
	\$34,154	\$56,800	\$69,616	\$76,129	\$78,892	\$83,821	\$87,368	\$100,474		\$73,340

Active Age Service Grid – DROP Members

Active DROP Member Count and Covered Payroll by Age and Service

Age	Years of Service								Total	
	<1	1-4	5-9	10-14	15-19	20-24	25-29	30-34		35+
<25										
25-29										
30-34										
35-39										
40-44										
45-49							35			35
							\$86,820			\$86,820
50-54						5	75	17		97
						\$77,350	\$87,474	\$103,457		\$89,753
55-59						8	13	14		35
						\$80,191	\$84,461	\$96,851		\$88,441
60-64										
65-69										
70+										
Total						13	123	31		167
						\$79,098	\$86,970	\$100,474		\$88,864

Annuitant Statistics

Retirement Annuities

Sex	Count	Avg Age	Total Annuity	Average Annuity
M	1,226	67.8	57,576,464	46,963
F	<u>49</u>	57.2	<u>2,119,304</u>	43,251
Total	1,275	67.4	59,695,768	46,820

Survivor Annuities

Sex	Count	Avg Age	Total Annuity	Average
M	12	26.7	34,647	2,887
F	<u>268</u>	73.8	<u>4,875,185</u>	18,191
Total	280	71.8	4,909,832	17,535

Disability Retirement Annuities

Sex	Count	Avg Age	Total Annuity	Average
M	123	56.6	4,470,633	36,347
F	<u>21</u>	51.9	<u>754,954</u>	35,950
Total	144	55.9	5,225,587	36,289

Deferred Annuities

Sex	Count	Avg Age	Total Annuity	Average
M	13	48.5	401,805	30,908
F	<u>5</u>	48.0	<u>167,807</u>	33,561
Total	18	48.4	569,612	31,645

Distribution of Retirement Annuities by Age

	Male			Female			Total		
	Count	Total Annuities	Average Annuities	Count	Total Annuities	Average Annuities	Count	Total Annuities	Average Annuities
x < 45	0	0	0	0	0	0	0	-	0
45 <= x < 50	24	1,092,561	45,523	4	147,224	36,806	28	1,239,785	44,278
50 <= x < 55	106	4,750,001	44,811	14	593,090	42,364	120	5,343,091	44,526
55 <= x < 60	167	7,704,046	46,132	19	854,917	44,996	186	8,558,963	46,016
60 <= x < 65	214	10,668,195	49,851	7	295,629	42,233	221	10,963,824	49,610
65 <= x < 70	175	9,057,750	51,759	4	194,367	48,592	179	9,252,117	51,688
70 <= x < 75	234	11,392,411	48,686	0	0	0	234	11,392,411	48,686
75 <= x < 80	179	7,999,182	44,688	1	34,077	34,077	180	8,033,259	44,629
80 <= x < 85	81	3,437,030	42,432	0	0	0	81	3,437,030	42,432
85 <= x < 90	29	1,000,386	34,496	0	0	0	29	1,000,386	34,496
90 <= x	17	474,902	27,935	0	0	0	17	474,902	27,935
Total	1,226	57,576,464	46,963	49	2,119,304	43,251	1,275	59,695,768	46,820

Distribution of Survivor Annuities by Age

	Male			Female			Total		
	Count	Total Annuities	Average Annuities	Count	Total Annuities	Average Annuities	Count	Total Annuities	Average Annuities
x < 20	5	9,787	1,957	9	16,695	1,855	14	26,482	1,892
20 <= x < 25	4	8,911	2,228	2	4,852	2,426	6	13,763	2,294
25 <= x < 30	0	0	0	0	0	0	0	0	0
30 <= x < 35	0	0	0	2	36,662	18,331	2	36,662	18,331
35 <= x < 40	1	10,935	10,935	1	1,800	1,800	2	12,735	6,368
40 <= x < 45	0	0	0	4	51,030	12,758	4	51,030	12,758
45 <= x < 50	0	0	0	5	75,901	15,180	5	75,901	15,180
50 <= x < 55	0	0	0	5	90,240	18,048	5	90,240	18,048
55 <= x < 60	1	2,102	2,102	10	197,771	19,777	11	199,873	18,170
60 <= x < 65	1	2,912	2,912	14	273,972	19,569	15	276,884	18,459
65 <= x < 70	0	0	0	21	429,700	20,462	21	429,700	20,462
70 <= x < 75	0	0	0	43	967,609	22,503	43	967,609	22,503
75 <= x < 80	0	0	0	43	849,605	19,758	43	849,605	19,758
80 <= x < 85	0	0	0	37	693,632	18,747	37	693,632	18,747
85 <= x < 90	0	0	0	46	746,245	16,223	46	746,245	16,223
90 <= x	0	0	0	26	439,471	16,903	26	439,471	16,903
Total	12	34,647	2,887	268	4,875,185	18,191	280	4,909,832	17,535

Distribution of Disability Annuities by Age

	Male			Female			Total		
	Count	Total Annuities	Average Annuities	Count	Total Annuities	Average Annuities	Count	Total Annuities	Average Annuities
x < 20	0	0	0	0	0	0	0	0	0
20 <= x < 25	0	0	0	0	0	0	0	0	0
25 <= x < 30	1	30,735	30,735	0	0	0	1	30,735	30,735
30 <= x < 35	3	70,322	23,441	0	0	0	3	70,322	23,441
35 <= x < 40	4	124,666	31,167	0	0	0	4	124,666	31,167
40 <= x < 45	6	199,857	33,310	4	143,197	35,799	10	343,054	34,305
45 <= x < 50	25	889,408	35,576	3	100,471	33,490	28	989,879	35,353
50 <= x < 55	19	664,028	34,949	6	220,069	36,678	25	884,097	35,364
55 <= x < 60	18	766,774	42,599	6	233,963	38,994	24	1,000,737	41,697
60 <= x < 65	20	807,390	40,370	2	57,254	28,627	22	864,644	39,302
65 <= x < 70	10	365,857	36,586	0	0	0	10	365,857	36,586
70 <= x < 75	11	357,759	32,524	0	0	0	11	357,759	32,524
75 <= x < 80	4	128,630	32,158	0	0	0	4	128,630	32,158
80 <= x < 85	1	41,159	41,159	0	0	0	1	41,159	41,159
85 <= x < 90	0	0	0	0	0	0	0	0	0
90 <= x	1	24,048	24,048	0	0	0	1	24,048	24,048
Total	123	4,470,633	36,347	21	754,954	35,950	144	5,225,587	36,289

Distribution of Deferred Annuities by Age

	Male			Female			Total		
	Count	Total Annuities	Average Annuities	Count	Total Annuities	Average Annuities	Count	Total Annuities	Average Annuities
x < 40	0	0	0	0	0	0	0	-	0
40 <= x < 45	3	90,165	30,055	1	15,764	15,764	4	105,929	26,482
45 <= x < 50	5	151,448	30,290	3	139,162	46,387	8	290,610	36,326
50 <= x < 55	4	131,635	32,909	1	12,881	12,881	5	144,516	28,903
55 <= x < 60	0	0	0	0	0	0	0	-	0
60 <= x < 65	1	28,557	28,557	0	0	0	1	28,557	28,557
65 <= x < 70	0	0	0	0	0	0	0	-	0
70 <= x	0	0	0	0	0	0	0	-	0
Total	13	401,805	30,908	5	167,807	33,561	18	569,612	31,645

ACTUARIAL ASSUMPTIONS AND METHODS

Below is a summary of the actuarial assumptions for the December 31, 2019 valuation. An experience study was performed in May of 2020 based on data for the period December 31, 2013 through December 31, 2018. The assumptions below are based on the experience study and were adopted effective December 31, 2019.

Interest Rate	7.25% (net of investment-related expenses)
Mortality Rates	<i>Healthy Active Lives:</i> PubS-2010 (amount-weighted) employee tables. <i>Retiree and Vested Terminated Lives:</i> PubS-2010 (amount-weighted) healthy retiree tables adjusted by 94%. <i>Contingent Survivor Lives:</i> PubS-2010 (amount-weighted, above-median) contingent survivor tables adjusted by 105%. <i>Disabled Lives:</i> PubS-2010 (amount-weighted) disabled retiree tables. The mortality assumptions for all participants are sex distinct with mortality improvement projected five years beyond the valuation date using scale MP-2019 and a base year of 2010. We feel these assumptions sufficiently accommodate anticipated future mortality improvements. Previously, RP-2014 Mortality Tables for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for females was then established to be 2012. Mortality rates for a particular calendar year are determined by applying the MP-2018 mortality improvement scale to the above described tables
Cost-of-Living Adjustment	0.00% for calendar year 2020 and thereafter (Previously 1.25% in 2019).
Inflation	2.50%
Salary Increases	See Table 1 later in this section.
Retirement Rates	See Table 2 later in this section.
Termination Rates	See Table 3 later in this section.
Disability Rates	See Table 4 later in this section.
Percent Married	80% (Previously 75%)

Spousal Age Difference	Spouse of male member assumed to be 3 years younger than member; Spouse of female member assumed to be 3 years older than member.
Purchasing Military Service Load	0.75% of payroll is included in pension normal cost calculations.
Dependent Children	Members who receive a death-in-service benefit are assumed to have two children for whom benefits are paid for 10 years.
Contribution Rates	Members – 14.00% State – 26.50%
Actuarial Cost Method	Entry Age Normal, with costs allocated on basis of earnings. Actuarial gains and losses are reflected in the unfunded actuarial liability.
Actuarial Asset Method	Market value of assets adjusted by the unrecognized investment gains and losses for each of the four years prior to the valuation date. Gains and losses are recognized at a rate of 25% per year. Actuarial Assets shall not be less than 80% nor greater than 120% of Market Value of Assets.
Payroll Growth	3.00% (Previously 3.50%) for purposes of amortizing the Unfunded Actuarial Accrued Liability.
Administrative Expenses	\$1,542,884 in 2020, based on the average of actual expenses incurred in the prior two fiscal years. (Previously 1.20% of Payroll), and then increases based on 2.5% inflation rate annually.
DROP Duration	5 years.
DROP Election	15% of active members eligible for unreduced retirement/DROP do not enter the DROP or retire in any given year prior to age 60. Previously, it was assumed that members eligible to DROP would either retire or “DROP in” at first eligibility for unreduced retirement.
Source of Data	Data and audited financial information is provided by the Fund.
Valuation Date	December 31, 2019.

Changes in Funding Assumptions/Methods Since the Prior Valuation

Method Changes

- Decrement timing was changed from middle-of-year to beginning-of-year to be consistent with the decrement timing assumptions used in the measurement of retirement plan obligations; and,
- Foster & Foster, Inc. was retained as the Plan's actuary for the actuarial valuation to be performed as of December 31, 2019, and to prepare the Plan's financial accounting results for the measurement period ending on December 31, 2019. As a result, these measurements reflect the changes in miscellaneous assumptions and methods—including but not limited to rounding conventions, valuation approaches, and calculation techniques—that are typical in situations involving a transition of actuarial service providers.

Assumption Changes

The valuation reflects the following assumption changes to better reflect anticipated experience. These changes were based on an experience study performed May 20, 2020:

- Updated retirement rates, withdrawal rates, disability rates and mortality rates.
- Updated salary increase rates.
- Updated the DROP election to assume that 15% of active members eligible for unreduced retirement/DROP do not enter the DROP or retire in any given year prior to age 60.
- Lowered the payroll growth assumption from 3.50% to 3.00%
- Increased marriage percentage from 75% to 80%.

Table 1 – Salary Increase Rates

Service	Salary Increase Rate	
	Current	Prior
0	13.50%	13.50%
1	13.50%	13.50%
2	9.50%	13.50%
3	9.50%	6.50%
4	8.00%	6.50%
5	8.00%	6.50%
6-10	5.00%	4.50%
11	5.00%	3.80%
12+	3.80%	3.80%

Table 2 – Retirement Rates

Age	Normal Retirement Rate		Early Retirement Rate	
	Current	Prior	Current	Prior
48	20%	30%	5%	3%
49-50	15%	15%	5%	2%
51	15%	15%	10%	2%
52	20%	15%		
53	10%	15%		
54	20%	10%		
55	30%	30%		
56	40%	25%		
57-58	40%	30%		
59	40%	40%		
60+	100%	100%		

Table 3 – Termination Rates

Service	Termination Rate	
	Current	Prior
0	13.00%	10.00%
1	6.50%	10.00%
2	6.50%	4.00%
3-5	4.50%	4.00%
6-9	2.50%	1.00%
10-15	1.00%	1.00%
16-20	1.00%	0.75%
21+	2.50%	0.50%

Table 4 – Disability Rates (Sample Rates)

Age	Disability Rates	
	Current	Prior
20	0.06%	0.08%
25	0.06%	0.08%
30	0.17%	0.23%
35	0.32%	0.42%
40	0.53%	0.70%
45	0.64%	0.85%
50	0.85%	1.13%
55	1.00%	1.32%
60	0.00%	0.00%

55% (Previously 50%) of disabilities assumed to be service-incurred.

GLOSSARY

Covered Payroll is the annualized pensionable salary earned during the year ended on the valuation date.

Valuation Payroll is the projected annual pensionable salary starting on the valuation date of all active participants who are not subject to a 100% probability of retirement on the valuation date.

Present Value of Benefits is the single sum value on the valuation date of all future benefits to be paid to current Members, Retirees, Beneficiaries, Disability Retirees and Vested Terminations.

Normal (Current Year's) Cost is the current year's cost for benefits yet to be funded.

Unfunded Accrued Liability is a liability which arises when a pension plan is initially established or improved and such establishment or improvement is applicable to all years of past service.

Entry Age Normal Cost Method - Under this method, the normal cost is the sum of the individual normal costs for all active participants. For an active participant, the normal cost is the participant's normal cost accrual rate, multiplied by the participant's current compensation.

- (a) The normal cost accrual rate equals:
 - (i) the present value of future benefits for the participant, determined as of the participant's entry age, divided by
 - (ii) the present value of the compensation expected to be paid to the participant for each year of the participant's anticipated future service, determined as of the participant's entry age.
- (b) In calculating the present value of future compensation, the salary scale is applied both retrospectively and prospectively to estimate compensation in years prior to and subsequent to the valuation year based on the compensation used for the valuation.
- (c) The accrued liability is the sum of the individual accrued liabilities for all participants and beneficiaries. A participant's accrued liability equals the present value, at the participant's attained age, of future benefits less the present value at the participant's attained age of the individual normal costs payable in the future. A beneficiary's accrued liability equals the present value, at the beneficiary's attained age, of future benefits. The unfunded accrued liability equals the total accrued liability less the actuarial value of assets.
- (d) Under this method, the entry age used for each active participant is the participant's age at the time he or she would have commenced participation if the plan had always been in existence under current terms, or the age as of which he or she first earns service credits for purposes of benefit accrual under the current terms of the plan.

DISCUSSION OF RISK

ASOP No. 51, Assessment and Disclosure of Risk Associated with Measuring Pension Obligations and Determining Pension Plan Contributions, states that the actuary should identify risks that, in the actuary's professional judgment, may reasonably be anticipated to significantly affect the plan's future financial condition.

Throughout this report, actuarial results are determined under various assumption scenarios. These results are based on the premise that all future plan experience will align with the plan's actuarial assumptions; however, there is no guarantee that actual plan experience will align with the plan's assumptions. It is possible that actual plan experience will differ from anticipated experience in an unfavorable manner that will negatively impact the plan's funded position.

Below are examples of ways in which plan experience can deviate from assumptions and the potential impact of that deviation. Typically, this results in an actuarial gain or loss representing the current-year financial impact on the plan's unfunded liability of the experience differing from assumptions; this gain or loss is amortized over a period of time determined by the plan's amortization method. When assumptions are selected that adequately reflect plan experience, gains and losses typically offset one another in the long term, resulting in a relatively low impact on the plan's amortization period. When assumptions are too optimistic, losses can accumulate over time and the plan's amortization period could potentially grow to an unmanageable level.

- **Investment Return:** When the rate of return on the Actuarial Value of Assets falls short of the assumption, this produces a loss representing assumed investment earnings that were not realized. Further, it is unlikely that the plan will experience a scenario that matches the assumed return in each year as capital markets can be volatile from year to year. Therefore, amortization periods can vary in the future.
- **Salary Increases:** When a plan participant experiences a salary increase that was greater than assumed, this produces a loss representing the cost of an increase in anticipated plan benefits for the participant as compared to the previous year. The total gain or loss associated with salary increases for the plan is the sum of salary gains and losses for all active participants.
- **Payroll Growth:** The plan's payroll growth assumption, if one is used, causes a predictable annual increase in the plan's amortization payment in order to produce an amortization payment that remains constant as a percentage of payroll if all assumptions are realized. If payroll does not increase according to the plan's payroll growth assumption, the plan's amortization period can increase significantly even if all assumptions other than the payroll growth assumption are realized since anticipated contribution rely upon membership payroll.
- **Demographic Assumptions:** Actuarial results take into account various potential events that could happen to a plan participant, such as retirement, termination, disability, and death. Each of these potential events is assigned a liability based on the likelihood of the event and the financial consequence of the event for the plan. Accordingly, actuarial liabilities reflect a blend of financial consequences associated with various possible outcomes (such as retirement at one of various possible ages). Once the outcome is known (e.g. the participant retires) the liability is adjusted to reflect the known outcome. This adjustment produces a gain or loss depending on whether the outcome was more or less favorable than other outcomes that could have occurred.

- **Amortization Period:** Risks associated with the items outlined above will inherently create varying liabilities and assets resulting in volatility in the amortization period. Actuarial losses on assets and liabilities will lead to longer amortization periods, while actuarial gains on assets and liabilities will lead to shorter amortization periods.
- **Contribution Risk:** This risk results from the potential that the total annual contributions, based on fixed-rates for the State and membership, may deviate from actuarially determined contributions. The actuarially determined contributions are adjusted in conjunction with each actuarial valuation to take into account the deviation in actual versus expected experience between valuation dates. Fixed-rate contribution structures include the risk that scheduled contributions do not reflect the actual cost of plan benefits, meaning that in order to maintain actuarially sound funding levels, contribution rate increases or benefit reductions may be required.

Impact of Plan Maturity on Risk

For newer pension plans, most of the participants and associated liabilities are related to active members who have not yet reached retirement age. As pension plans continue in operation and active members reach retirement ages, liabilities begin to shift from being primarily related to active members to being shared amongst active and retired members. Plan maturity is a measure of the extent to which this shift has occurred. It is important to understand that plan maturity can have an impact on risk tolerance and the overall risk characteristics of the plan. For example, plans with a large amount of retired liability do not have as long of a time horizon to recover from losses (such as losses on investments due to lower than expected investment returns) as plans where the majority of the liability is attributable to active members. For this reason, less tolerance for investment risk may be warranted for highly mature plans with a substantial inactive liability. Similarly, mature plans paying substantial retirement benefits resulting in a small positive or net negative cash flow can be more sensitive to near term investment volatility, particularly if the size of the fund is shrinking, which can result in less assets being available for investment in the market.

To assist with determining the maturity of the Fund, we have provided some relevant metrics in the table following titled “Fund Maturity Measures and Other Risk Metrics”. Highlights of this information are discussed below:

- The Support Ratio, determined as the ratio of active to inactive members, has decreased from 105.0% on December 31, 2016 to 94.0% as of December 31, 2019, indicating that the Fund's maturity level has not significantly changed during the period
- The Accrued Liability Ratio, determined as the ratio of the Inactive Accrued Liability, which is the liability associated with members who are no longer employed but are due a benefit from the Fund, to the Total Accrued Liability, is 61.3%. With a plan of this maturity, losses due to lower than expected investment returns or demographic factors must be made up over a shorter time horizon than would be needed for a less mature plan.
- The Funded Ratio, determined as the ratio of the Actuarial Value of Assets to the Total Accrued Liability, has remained relatively stable over the four-year period ending December 31, 2019.

- The Net Cash Flow Ratio, determined as the ratio of the Net Cash Flow (contributions minus benefit payments and administrative expenses) to the Market Value of Assets, is around -4.7% to -3.4%. A Net Cash Flow Ratio in this range indicates that contributions are not sufficient to cover the Fund's benefit payments and administrative expenses.

It is important to note that the actuary has identified the risks above as the most significant risks based on the characteristics of the Fund and the nature of the project, however, it is not an exhaustive list of potential risks that could be considered. Additional advanced modeling, as well as the identification of additional risks, can be provided at the request of the audience addressed in the cover letter of this report.

Fund Maturity Measures and Other Risk Metrics

	12/31/2019	12/31/2018	12/31/2017	12/31/2016
<u>Support Ratio</u>				
Total Actives	1,614	1,668	1,650	1,670
Total Inactives	1,717	1,688	1,648	1,590
Actives / Inactives	94.0%	98.8%	100.1%	105.0%
<u>Asset Volatility Ratio</u>				
Market Value of Assets (MVA)	817,859,488	715,480,960	786,356,140	721,685,656
Total Covered Payroll	118,370,595	116,009,622	112,705,188	108,788,871
MVA / Total Covered Payroll	690.9%	616.7%	697.7%	663.4%
<u>Accrued Liability (AL) Ratio</u>				
Inactive Accrued Liability	719,452,018	706,952,911	717,621,283	688,936,795
Total Accrued Liability	1,173,155,313	1,158,179,566	1,153,619,256	1,127,927,927
Inactive AL / Total AL	61.3%	61.0%	62.2%	61.1%
<u>Funded Ratio</u>				
Actuarial Value of Assets (AVA)	796,284,462	769,097,204	774,670,663	763,667,712
Total Accrued Liability	1,173,155,313	1,158,179,566	1,153,619,256	1,127,927,927
AVA / Total Accrued Liability	67.9%	66.4%	67.2%	67.7%
<u>Net Cash Flow Ratio</u>				
Net Cash Flow ¹	(28,058,421)	(33,264,229)	(37,290,288)	(29,319,030)
Market Value of Assets (MVA)	817,859,488	715,480,960	786,356,140	721,685,656
Ratio	-3.4%	-4.6%	-4.7%	-4.1%

¹ Determined as total contributions minus benefit payments and administrative expenses.

PLAN PROVISIONS

The following describe and reflect provisions in effect as described in Chapter 5505 of the Ohio Revised Code.

Membership Eligibility

All sworn officers and cadets in training at the academy are required to become members of the retirement system. The beginning date of membership in the system for sworn officers hired prior to June 30, 1991, is the commission date. All cadets entering the academy after that date become members of OHPRS upon entering the academy. Any persons hired prior to November 2, 1989, in the radio division are HPRS members. The beginning date of membership of the radio division member is the date of hire.

Highway Patrol Retirement System

The Plan is established and administered as prescribed by “Chapter 5505-Highway Patrol Retirement System” of the Ohio Revised Code.

Plan Administration

The Plan is administered by a Board of Trustees comprised of:

- a) The superintendent of the state highway patrol,
- b) Two retired Members who reside in Ohio,
- c) Five active Members,
- d) One member appointed by the treasurer of state, and
- e) Two investment expert members. One is appointed by the governor, and the other is jointly appointed by the speaker of the house of representatives and the president of the senate.

Credited Service

Total service credit is the total years of contributing service, or part thereof, purchased service credit and any additional service credit approved by the Board.

Normal Retirement

Eligibility

Age 52 and 20 years of Credited Service. or
Age 48 with 25 years of Credited Service if hired prior to January 1, 2020.

Benefit

Sum of (1) 2.5% of final average salary [average of salaries during highest 5 years (3 years prior to January 1, 2015)] times years of service not in excess of 20,
(2) 2.25% of final average salary times years of service in excess of 20 but not in excess of 25 and,
(3) 2% of final average salary times years of service in excess of 25. The maximum pension payable is 79.25% of the

member's final average salary. A member must retire upon attainment of age 60 or completion of 20 years of service, whichever occurs later.

Form of Benefit

- (1) A Single Life Annuity or,
- (2) Actuarial equivalent Joint and Survivor Annuity with designating any percentage over 10% to the beneficiary or,
- (3) Life Annuity Certain and Continuous between 5 to 20 years, or
- (4) Partial Lump Sum if a member who is at least 52 with 20 years of total service; the partial lump sum benefit is not less than 6 times the monthly amount payable to the member as a single lifetime pension and not more than 60 times that amount

Early Retirement

Eligibility

Age 48 through 51 and has accumulated at least 20 years but less than 25 years of Credited Service. Or
 Age 48 through 51 and has accumulated at least 20 years of Credited Service if hired on or after January 1, 2020.

Benefit

Normal Retirement benefit, reduced as followed

Attained Age	Percent of normal retirement benefit
48	75%
49	80%
50	86%
51	93%

Form of Benefit

Same as Normal Retirement.

Disability Benefit

Eligibility

Total and permanent as determined by the Board of Trustees incapacitated for in the line of duty or five or more years of service for disability incurred off-duty.

Benefit Amount

A maximum of:

- a.) 61.25% of final average salary, and;
- b.) The normal retirement pension that the Member is entitled to receive if he or she retired immediately.

For off-duty disabilities, a benefit is the larger of a.) 30% of final average salary or b.) normal retirement pension.

Cost-of-Living Adjustment

Retirees: A cost of living allowance (COLA) will be received after age 60 (age 53 for members retired or entered the DROP prior to 1/7/2013) or twelve months after they retire, whichever is later.

Disability members retired prior to 1/7/2013 are eligible for the increase after receiving benefits for sixty months or age 53 whichever occurs first.

The board establishes an annual COLA between 0% and 3% and must be based on compliance with the amortization period requirement of section 5505.121 of the Ohio Revised Code. The board's determination shall be based on the annual actuarial valuation required by section 5505.12 of the Ohio Revised Code. If the board determines that an increase may be made, the increase shall not exceed three percent (3%) of the eligible person's pension. The base pension used in the first calculation for the additional COLA amount shall remain as the COLA base for all future increases. The current COLA is 0%.

Survivor Benefit

Eligibility

A surviving spouse is considered to be the wife or husband as set forth in a statutory valid certificate of marriage or as recognized by judgment of a court. A surviving child is considered to be the child by birth or the legally adopted child of the member or retiree.

Benefit Amount

Surviving spouse and dependent children pension amounts are established by statute as follows:

- A. A surviving spouse is eligible to receive pension benefits for the remainder of his/her life.
 1. A surviving spouse of a member who retired or entered DROP before May 11, 2018, will receive an amount equal to 50% of the retiree's pension benefit or \$900.00/month, whichever is greater.
 2. A surviving spouse of a member who retired or entered DROP on or after May 11, 2018, will receive a set amount (\$900.00/month in 2018), but this amount increases annually by a COLA amount set by the board. The survivor benefit is in addition to any amount selected through a Joint and Survivor Annuity (JSA).
 3. A surviving spouse of an active member who is not eligible for retirement will receive a set amount (\$900.00/month in 2018), but this amount increases annually by a COLA amount set by the board.
 4. A surviving spouse of an active member who is eligible for retirement but has not elected to enter DROP or retire will receive a 50% JSA calculated on what the member's pension would have been had he/she retired the day after death. In addition, the surviving spouse will receive the established survivor benefit set for that year.

- B. A surviving child is considered to be the child by birth or the legally adopted child of the member or retiree.
1. A surviving child is eligible for benefits until attainment of age 18 or marriage; however, survivor benefits will continue until age 23 if such dependent child is a full-time student. Benefits are \$150 per month.
 2. A surviving child who is physically or mentally incompetent and who was totally dependent on the deceased member or retiree at the time of death is eligible for benefits until recovery or death. Benefits are \$150 per month.

Additionally, a \$5,000 lump sum benefit is payable upon the death of the retiree.

Vesting (Termination) Benefit:

Vesting Service Requirement	15 or more years of credit service.
Non-Vested Benefit	Refund of Member Contributions.
Vested Benefit	Payable upon reaching age 55 (or 48 with reduced benefit or 52 with unreduced benefit, if a member who has accumulated at least 20 years), provided contributions are not withdrawn, or a refund of member contributions. The termination benefit is 1.50% of average final salary times creditable service. If a member has completed 20 years of service and retires, they are eligible to receive a pension computed in the same manner as a retirement benefit.

Minimum Benefit:

All members who retired with a Retirement or Disability Benefit are eligible to receive a minimum benefit of \$1,050 per month.

Contributions

Member	Set by the retirement board annually. The percentage shall be not less than 10.0% and no more than 14.0% of a member's Salary.
Employer	The employer contribution rate is set by statute, currently set at 26.5%.

SUPPLEMENTARY TABLES

Table 1 – History of the Development of Unfunded Actuarial Accrued Liability

	Year Ending December 31				
	2019	2018	2017	2016	2015
1. Unfunded Actuarial Accrued Liability (UAAL), as of beginning of year	389,082,362	378,948,593	364,260,215	339,135,677	300,466,733
2. Total Normal Cost, as of beginning of year	23,248,328	22,033,532	21,901,786	20,149,707	18,528,203
3. Expected Interest on 1. and 2.	29,893,975	30,222,315	29,078,861	27,063,816	24,778,467
4. Contributions, with interest	51,117,770	42,241,099	42,685,668	41,385,236	38,862,627
6. Expected UAAL as of end of year (1)+(2)+(3)-(4)	391,106,895	388,963,341	372,555,193	344,963,965	304,910,775
7. Change in UAAL Due to Actuarial (Gain)/Loss, by component:					
Investment Return	154,476	31,264,298	9,943,102	4,839,839	(1,471,554)
Salary Increases	1,711,714	(459,716)	2,883,793	11,313,936	(6,155,599)
Decrement Experience	(7,319,472)	(1,453,717)	(1,065,239)	(2,636,439)	(1,276,726)
Inactive Mortality Experience	5,696,925				
Other Changes	772,615	2,351,765	(1,189,070)	5,778,914	(5,683,114)
Total change due to (Gain)/Loss	1,016,258	31,702,630	10,572,586	19,296,250	(14,586,993)
8. Change in UAAL Due to Assumption Changes/ Method Changes	(15,252,302)	(31,583,609)	(4,179,186)	-	48,811,895
9. Unfunded Actuarial Accrued Liability, as of end of year	376,870,851	389,082,362	378,948,593	364,260,215	339,135,677

Table 2 – History of Active Member Data

Actuarial Valuation Date	Active Members	Percent Increase	Annual Covered Payroll	Percent Increase	Average Covered Payroll	Percent Increase
12/31/2010	1,537		94,767,852		61,658	
12/31/2011	1,520	-1.1%	93,126,449	-1.7%	61,267	-0.6%
12/31/2012	1,645	8.2%	98,117,403	5.4%	59,646	-2.6%
12/31/2013	1,613	-1.9%	98,519,844	0.4%	61,079	2.4%
12/31/2014	1,622	0.6%	99,211,756	0.7%	61,166	0.1%
12/31/2015	1,621	-0.1%	99,983,224	0.8%	61,680	0.8%
12/31/2016	1,670	3.0%	108,788,871	8.8%	65,143	5.6%
12/31/2017	1,650	-1.2%	112,705,188	3.6%	68,306	4.9%
12/31/2018	1,668	1.1%	116,009,622	2.9%	69,550	1.8%
12/31/2019	1,614	-3.2%	118,370,595	2.0%	73,340	5.4%
5-year Average Increase/ (Decrease)		-0.1%		3.6%		3.7%

Table 3 – History of Retiree and Survivor Annuitant Data

Actuarial Valuation Date	Number of Annuitant	Total Annuities (Annual)	Average Annuities (Annual)	Increase in Average Benefit
12/31/2010	1,424	48,138,648	33,805	
12/31/2011	1,465	51,249,684	34,983	3.48%
12/31/2012	1,497	53,646,504	35,836	2.44%
12/31/2013	1,523	56,007,360	36,774	2.62%
12/31/2014	1,558	58,292,436	37,415	1.74%
12/31/2015	1,548	59,723,304	38,581	3.12%
12/31/2016	1,580	62,458,476	39,531	2.46%
12/31/2017	1,637	65,661,636	40,111	1.47%
12/31/2018	1,671	67,722,984	40,528	1.04%
12/31/2019	1,699	69,831,187	41,101	1.41%

Table 4 – History of Employee Annuitants and Survivors Added to Payroll

Year of Retirement	Added		Removed		Total	
	Number	Annual Benefits ¹	Number	Annual Benefits	Number	Annual Benefits
2010	64	3,119,568	25	497,568	1,424	48,138,648
2011	73	3,932,508	32	821,472	1,465	51,249,684
2012	79	3,380,304	47	983,484	1,497	53,646,504
2013	61	3,204,660	35	843,804	1,523	56,007,360
2014	66	3,008,568	31	723,492	1,558	58,292,436
2015	73	3,102,744	83 ²	1,671,876	1,548	59,723,304
2016	69	3,576,372	37	841,200	1,580	62,458,476
2017	83	3,878,244	26	675,084	1,637	65,661,636
2018	72	3,127,464	38	1,066,116	1,671	67,722,984
2019	63	2,881,148	35	772,944	1,699	69,831,187

1. Includes added benefits due to COLA increases for continuing retirees and survivors
2. Includes Alternate Payee records, which were combined with Participant records beginning with the December 31, 2015 valuation.

Table 5 – History of CAFR Asset Information

Year Ended	Pension Fund								Health Care Fund			
	Addition By Source				Deductions By Type				Addition By Source		Deductions By Type	
	Employer Contributions	Employee Contributions	Net Investment Income	Transfers from Other Systems	Administrative Expenses	Benefit Payments	Refunds	Transfers to Other Systems	Employer Contributions & Retiree Drug Subsidy and Prescription Drug Rebates	Net Investment Income	Benefits	Administrative Expenses
12/31/2010	21,211,944	9,221,920	72,158,093	329,335	637,943	49,106,165	476,936	566,615	3,699,814	17,734,416	10,536,554	106,450
12/31/2011	22,966,338	9,278,533	(16,039,272)	608,366	948,319	57,288,210	451,682	1,797,986	2,418,411	(2,746,073)	11,092,515	159,271
12/31/2012	23,766,361	9,641,772	63,783,964	557,316	859,477	57,110,650	179,614	377,994	2,553,023	101,994,19	11,025,550	137,943
12/31/2013	22,908,182	10,037,246	115,874,530	1,353,520	909,929	61,528,826	943,433	467,462	4,718,651	178,933,77	12,140,996	140,676
12/31/2014	22,325,421	11,577,268	45,104,959	586,929	1,031,473	64,525,978	2,177,476	165,945	5,859,320	67,992,67	12,308,478	156,176
12/31/2015	22,895,242	13,686,292	(5,649,718)	947,265	1,084,161	66,213,253	857,626	160,888	5,637,420	(647,032)	11,362,048	157,150
12/31/2016	25,383,684	14,101,171	46,423,126	773,206	1,352,722	65,720,438	1,730,725	416,679	5,944,616	68,347,60	11,676,450	193,246
12/31/2017	26,109,836	14,504,919	101,482,224	619,110	1,437,267	75,392,803	1,074,973	140,562	6,777,825	144,671,79	11,571,393	204,198
12/31/2018	26,014,314	14,451,649	(37,810,306)	410,250	1,435,864	71,577,589	716,739	210,895	7,784,260	(5,852,119)	11,699,575	203,812
12/31/2019	33,107,047	15,618,020	129,802,232	781,873	1,649,904	73,577,433	1,556,151	147,156	2,983,659	18,006,553	11,602,364	229,044

Table 6 – Funding Progress

Fiscal Year	Actuarial Accrued Liability	Actuarial Value of Assets	Fair Value of Net Assets	AVA / FVA	UAAL (AVA)	UAAL (FVA)	Funded Ratio (AVA)	Funded Ratio (FVA)	Covered Payroll	Funding Years
2010	1,017,770,449	630,971,500	647,094,901	97.51%	386,798,949	370,675,548	62.0%	63.6%	94,767,852	N/A
2011	1,047,699,686	623,360,121	603,422,669	103.30%	424,339,565	444,277,017	59.5%	57.6%	93,126,449	N/A
2012	966,310,485	658,428,914	642,644,347	102.46%	307,881,571	323,666,138	68.1%	66.5%	98,117,403	30
2013	989,101,470	690,605,582	728,968,175	94.74%	298,495,888	260,133,295	69.8%	73.7%	98,519,844	30
2014	1,012,752,337	712,285,604	740,661,880	96.17%	300,466,733	272,090,457	70.3%	73.1%	99,211,756	29
2015	1,078,984,597	739,848,920	704,225,033	105.06%	339,135,677	374,759,564	68.6%	65.3%	99,983,224	30
2016	1,127,927,927	763,667,712	721,685,656	105.82%	364,260,215	406,242,271	67.7%	64.0%	108,788,871	29
2017	1,153,619,256	774,670,663	786,356,140	98.51%	378,948,593	367,263,116	67.2%	68.2%	112,705,188	27
2018	1,158,179,566	769,097,204	715,480,960	107.49%	389,082,362	442,698,606	66.4%	61.8%	116,009,622	23
2019	1,173,155,313	796,284,462	817,859,488	97.36%	376,870,851	355,295,825	67.9%	69.7%	118,370,595	23

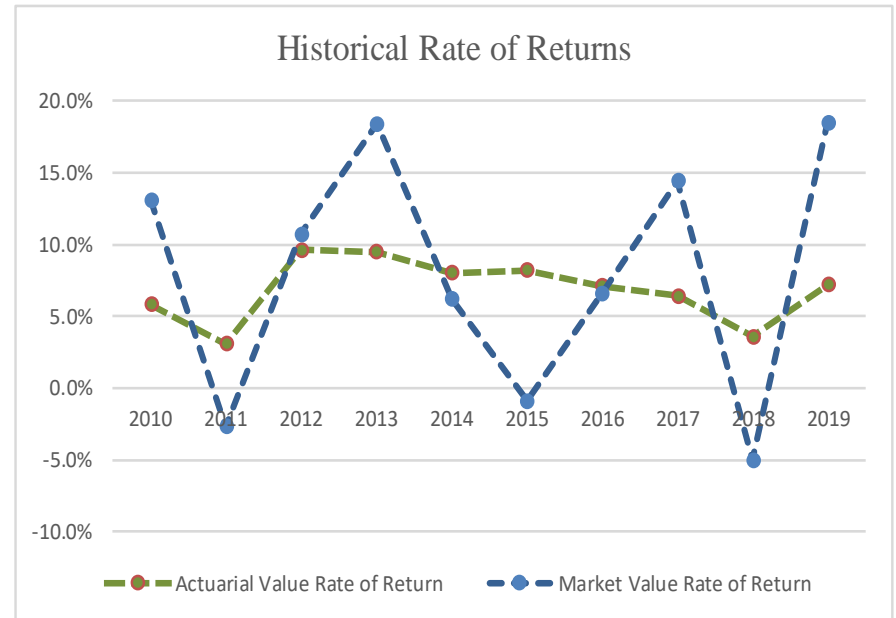
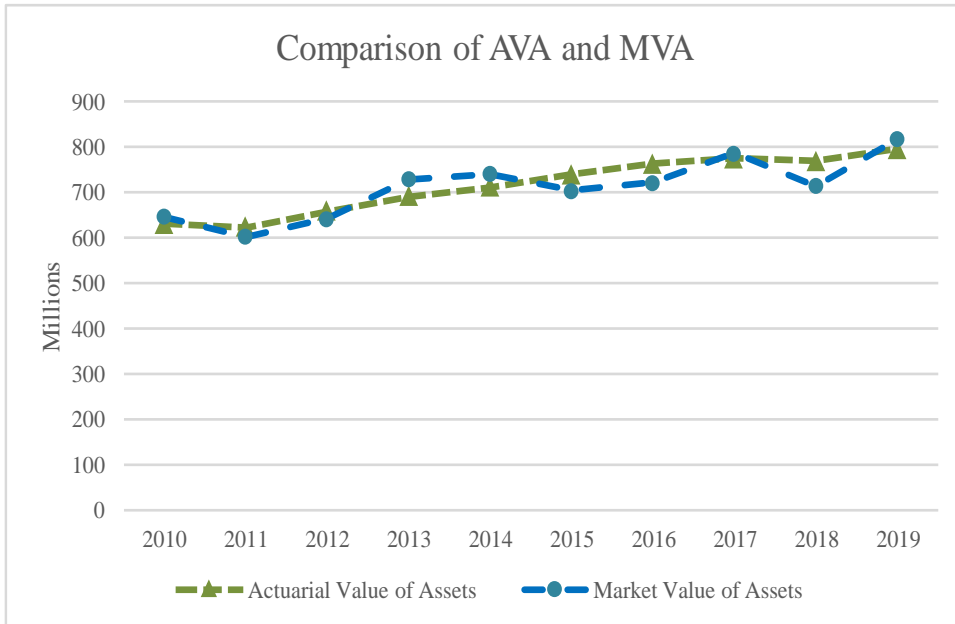


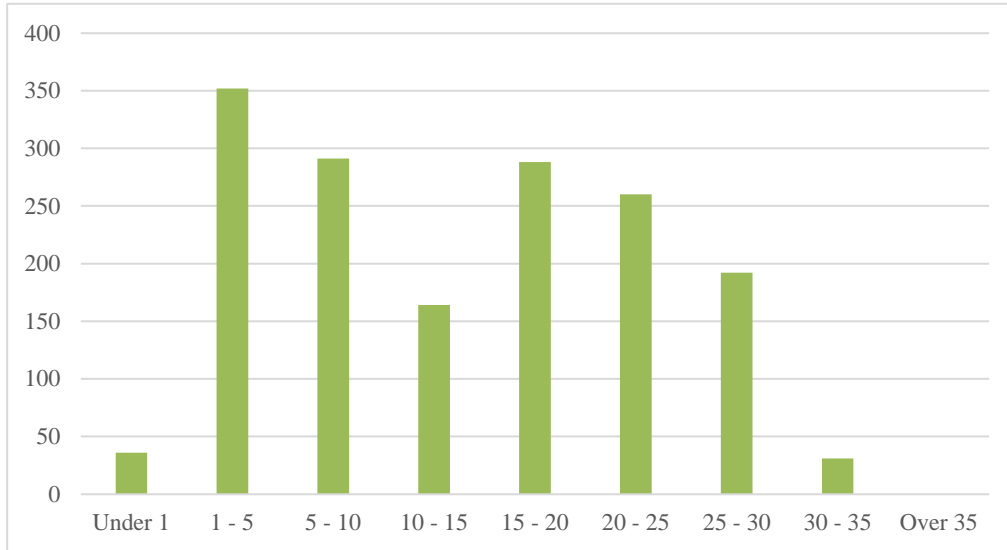
Table 7 – Solvency Test

	Actuarial Accrued Liabilities			Actuarial Value of Assets	Portion of Liabilities Covered by Assets		
	(1)	(2)	(3)		(1)	(2)	(3)
Year Ended	Active Member Contributions	Retirees, Survivors and Vested Deferreds	Active Members (ER Financed)		Active Member Contributions	Retirees, Survivors and Vested Deferreds	Active Members (ER Financed)
12/31/2010	104,503,065	583,714,389	329,552,995	630,971,500	100%	90%	0%
12/31/2011	104,701,161	618,984,073	324,014,452	623,360,121	100%	84%	0%
12/31/2012	108,311,937	586,311,106	271,687,442	658,428,914	100%	94%	0%
12/31/2013	113,334,067	601,342,081	274,425,322	690,605,582	100%	96%	0%
12/31/2014	117,441,639	622,719,141	272,591,557	712,285,604	100%	96%	0%
12/31/2015	122,286,821	662,562,480	294,135,296	739,848,920	100%	93%	0%
12/31/2016	127,311,764	688,936,795	311,679,368	763,667,712	100%	92%	0%
12/31/2017	130,494,700	717,621,283	305,503,273	774,670,663	100%	90%	0%
12/31/2018	138,101,643	706,952,911	313,125,012	769,097,204	100%	89%	0%
12/31/2019	143,160,097	719,452,018	310,543,198	796,284,462	100%	91%	0%

Table 8 – Contribution History

Year Ended	Actuarially Determined Contribution for Fiscal Year End	Actual Contribution	Deficiency (Excess) in Annual Contribution	% of Actuarially Determined Contribution Contributed
12/31/2010	22,872,487	21,211,944	1,660,543	93%
12/31/2011	26,956,449	22,966,338	3,990,111	85%
12/31/2012	30,488,160	23,766,361	6,721,799	78%
12/31/2013	35,429,985	22,908,182	12,521,803	65%
12/31/2014	29,767,228	22,325,421	7,441,807	75%
12/31/2015	22,446,316	22,895,242	(448,926)	102%
12/31/2016	24,407,389	25,383,684	(976,295)	104%
12/31/2017	25,349,355	26,109,836	(760,481)	103%
12/31/2018	26,014,314	26,014,314	0	100%
12/31/2019	31,269,882	33,107,047	(1,837,165)	106%

Graph 9 – Distribution of Active Members by Service



Graph 10 – Distribution of Active Members by Age

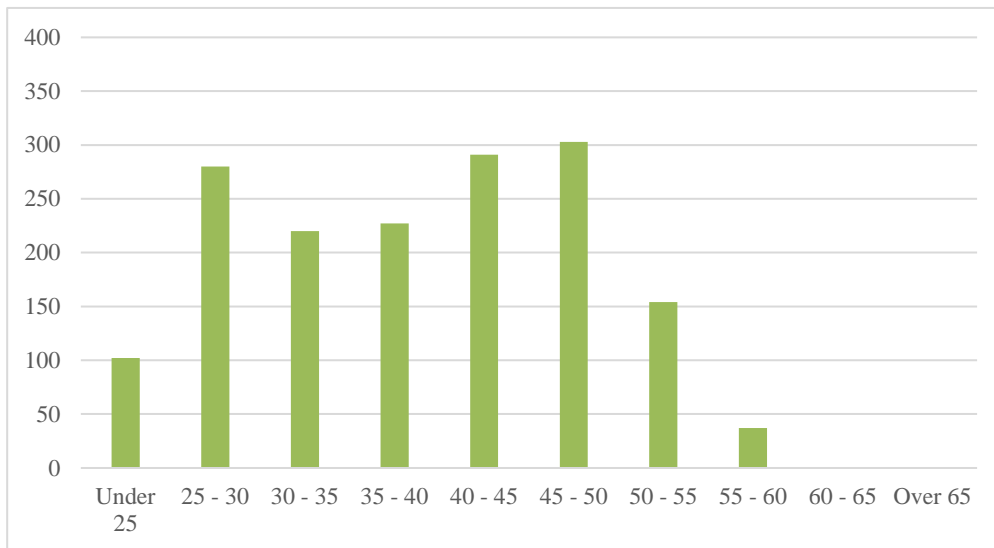
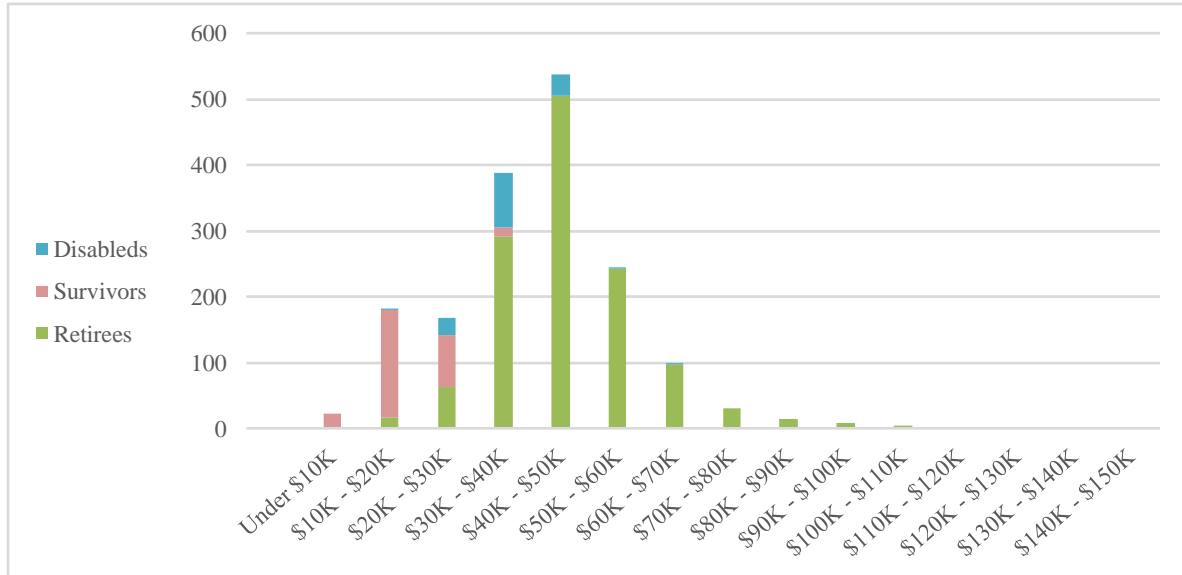
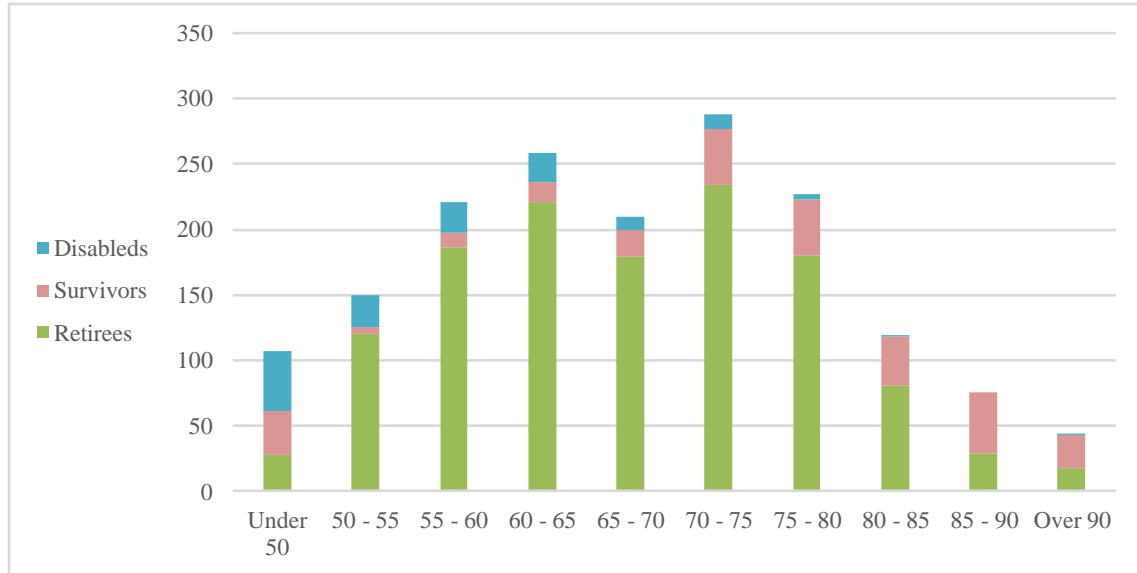


Table 11 – Distribution of Annuitants by Annual Benefit



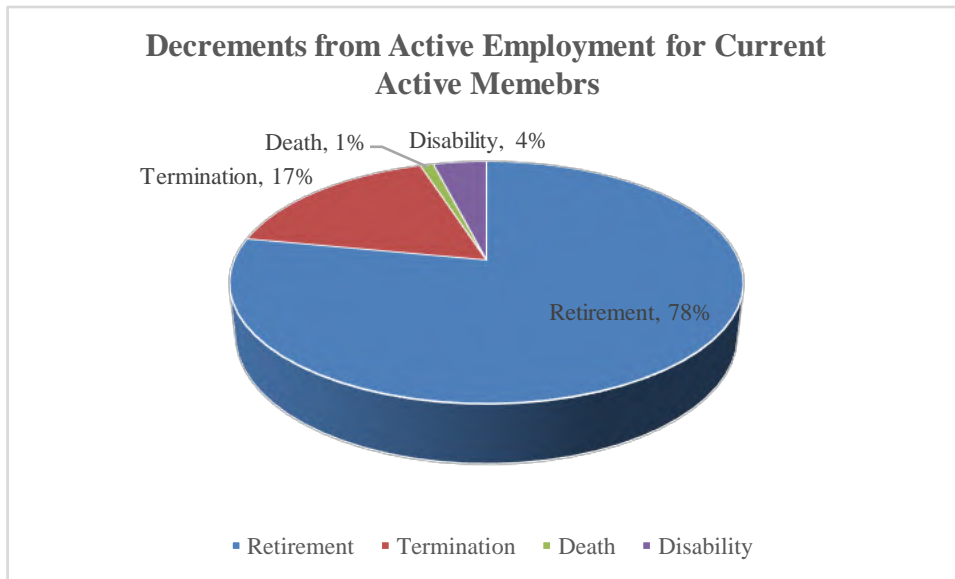
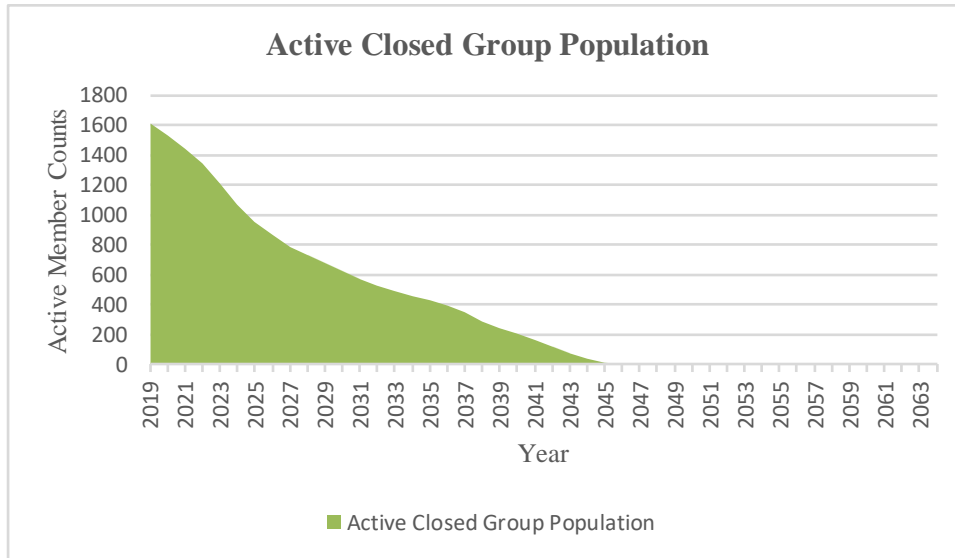
Annual Benefit	Retirees	Survivors	Disableds	Total
Under \$10K	0	23	0	23
\$10K - \$20K	17	163	1	181
\$20K - \$30K	62	80	26	168
\$30K - \$40K	292	14	81	387
\$40K - \$50K	505	0	32	537
\$50K - \$60K	243	0	2	245
\$60K - \$70K	97	0	2	99
\$70K - \$80K	30	0	0	30
\$80K - \$90K	15	0	0	15
\$90K - \$100K	9	0	0	9
\$100K - \$110K	5	0	0	5
Total	1275	280	144	1699

Table 12 – Distribution of Annuitants by Age



Age	Retirees	Survivors	Disableds	Total
Under 50	28	33	46	107
50 - 55	120	5	25	150
55 - 60	186	11	24	221
60 - 65	221	15	22	258
65 - 70	179	21	10	210
70 - 75	234	43	11	288
75 - 80	180	43	4	227
80 - 85	81	37	1	119
85 - 90	29	46	0	75
Over 90	17	26	1	44
Total	1,275	280	144	1,699

Graph 13-Projected Headcount of Present Population



The charts above show the expected future development of the present population in simplified terms. The Retirement System presently covers 1,614 active members. Eventually, 17% of the population is expected to terminate covered employment prior to retirement and forfeit eligibility for an employer provided benefit, or separating from service without withdrawing contributions. 78% of the present population is expected to receive monthly retirement benefits by retiring directly from active service. 5% of the present population is expected to become eligible for death-in-service or disability benefits. Within 9 years, over half of the covered membership is expected to consist of new hires.

Table 14 – Active DROP Members as of December 31, 2019

Attained Ages	No.	Annual Benefit	DROP Account Balance
48	19	\$ 940,133	\$ 472,987
49	16	797,550	1,319,329
50	25	1,188,152	2,782,599
51	22	1,083,053	3,430,188
52	20	936,912	2,902,198
53	15	669,353	2,417,077
54	15	719,407	3,201,361
55	19	794,638	3,939,876
56	8	373,464	2,038,733
57	4	150,957	1,076,491
58	4	164,242	1,215,127
Total	167	\$ 7,817,861	\$24,795,966

OHIO STATE HIGHWAY PATROL RETIREMENT SYSTEM
OTHER POSTEMPLOYMENT BENEFITS PROGRAM

ACTUARIAL VALUATION
AS OF DECEMBER 31, 2019



FOSTER & FOSTER
ACTUARIES AND CONSULTANTS

August 5, 2020

Board of Trustees
Ohio State Highway Patrol Retirement System
1900 Polaris Parkway
Suite 201
Columbus, Ohio 43240-4037

Dear Board:

We are pleased to present to the Board this annual actuarial valuation of Ohio State Highway Patrol Retirement System's Other Postemployment Benefits (OPEB) Program. This valuation was performed to determine the current funded status of the Plan.

The 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, and reflects all applicable federal laws and regulations. In our opinion, the assumptions used in this valuation, as adopted by OHPRS, represent reasonable expectations of anticipated plan experience.

In conducting the valuation, we have relied on personnel and plan design information supplied by OHPRS personnel, and the actuarial assumptions and methods described in the Actuarial Assumptions section of this report. While we cannot verify the accuracy of all this information, the supplied information was reviewed for consistency and reasonableness. Because of this review, we have no reason to doubt the substantial accuracy of the information and believe that it has produced appropriate results. This information, along with any adjustments or modifications, is summarized in various sections of this report.

The measurements shown in this actuarial valuation may not be applicable for other purposes. Future actuarial measurements may differ significantly from the current measurements presented in this report due to factors such as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes 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 this report, we did not provide an analysis of these potential differences.

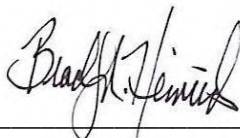
The undersigned are familiar with the immediate and long-term aspects of OPEB valuations and meet the Qualification Standards of the American Academy of Actuaries necessary to render the actuarial opinions contained herein. All sections of this report are considered an integral part of the actuarial opinions.

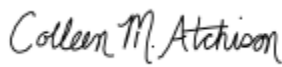
To our knowledge, no associate of Foster & Foster, Inc. working on valuations of the program has any direct financial interest or indirect material interest in OHPRS, nor does anyone at Foster & Foster, Inc. act as a member of the Board of Directors of OHPRS. Thus, there is no relationship existing that might affect our capacity to prepare and certify this actuarial report.

If there are any questions, concerns, or comments about any of the items contained in this report, please contact us at 239-433-5500.

Respectfully submitted,

Foster & Foster, Inc.

By: 
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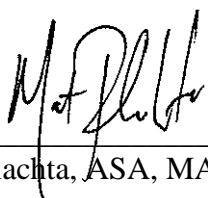
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SUMMARY OF RESULTS

The annual actuarial valuation of OHPRS's Other Postemployment Benefits Program as of December 31, 2019, has been performed and the results are presented in this Report. For purposes of this valuation medical, prescription drugs, dental, and vision were taken into consideration. The results described herein are applicable to the plan year ending December 31, 2019.

The following table shows the results of the December 31, 2019 valuation of the Plan:

Valuation Date	12/31/2019
Actuarially Determined Contribution As a Percent of Covered Payroll	14.62%
Actuarial Accrued Liability (AAL)	
Actives	\$ 134,575,043
Retirees	168,752,009
Total	\$ 303,327,052
Normal Cost	\$ 5,866,840
Funded Status as of the Valuation Date	
Actuarial Accrued Liability (AAL)	\$ 303,327,052
Actuarial Value of Assets (AVA)	108,058,572
Unfunded Actuarial Accrued Liability (UAAL)	\$ 195,268,480
Funded Ratio	35.6%
Covered Payroll	\$ 118,370,595
Ratio of UAAL to Covered Payroll	165.0%

Changes since the Prior Valuation

The following changes have been approved by the Board as a result of the most recent Actuarial Experience Study, based on valuation data for the years December 31, 2013 through December 31, 2018:

- **Retirement Rates:** There was a slight adjustment to the assumed rates of unreduced normal and reduced early retirement. Due to the mandatory retirement age based on Ohio Revised Code 5505.16(C), the 100% retirement assumption at age 60 was maintained, however, based on actual experience, the 100% retirement assumption of eligible members age 55 and older with 34 or more years of service was removed.
- **Withdrawal Rates:** There was a slight increase to the withdrawal rates.
- **Disability Rates:** There was a slight decrease to the disability rates and an increase in the percentage of disabilities assumed to be service-incurred from 50% to 55%.
- **Mortality Rates:** The RP-2014 Combined mortality rates has been updated to the following as well as the mortality improvement projection scale to MP-2019:
 - Active members – PubS-2010 (amount-weighted) employee tables
 - Retirees/VTs – PubS-2010 (amount-weighted) healthy retiree tables adjusted by 94%
 - Survivors – PubS-2010 (amount-weighted, above-median) contingent survivor adjusted by 105%
 - Disabled – PubS-2010 (amount-weighted) disabled retiree tables
- **Salary Increase:** The change in the salary increase rates reflects a higher increase at many service points.
- **DROP Experience:** This valuation assumes an increase from 0% to 15% of active members eligible for unreduced retirement/DROP do not enter the DROP or retire in any given year prior to age 60.
- **Administrative Expense Assumption:** The assumed expense load is based on the average of the actual expenses incurred in the prior two years instead of being a fixed rate.
- **Medical/Rx and Dental/Vision Election, and Spouse Coverage Assumptions** used in the measurements of the Plan's obligations.

The following additional changes have been made since the prior valuation:

- The census data reflects changes in status for the twelve (12) month period since December 31, 2018.
- The per capita claims cost has been updated to reflect the most recent 36-month Plan experience. Administrative fees, stop-loss premiums, and Medicare Advantage premium rates have also been updated to use rates effective January 1, 2020.
- Contribution rates paid by retirees and covered dependents have been updated to reflect the Plan's rates effective January 1, 2020.
- Health care inflation rates have been updated to reflect recent healthcare trend surveys in conjunction with actual plan experience.
- The timing of decrements and the increase in salary has been modified from middle to beginning of year.

The resulting effect of these changes is an overall increase in the unfunded actuarial accrued liability of \$42,722,087. This represents an increase of approximately 12% over the expected unfunded actuarial accrued liability, with the main driver of the increase being the updated health care trend rates.

This actuarial valuation involves estimates of the value of reported amounts and assumptions about the probability of events far into the future. Examples include assumptions about future employment, mortality, and the healthcare cost trend. Amounts determined regarding the funded status of the plan and the annual required contributions of the employer are subject to constant revision as actual experience is compared with past expectations and new estimates are made about the future.

Calculations are based upon the types of benefits provided under the terms of the substantive plan at the time of the valuation and on the pattern of sharing of costs between the employer and plan members to that point. Calculations reflect a long-term perspective, so methods and assumptions used include techniques that are designed to reduce short-term volatility in actuarial accrued liabilities and the actuarial value of assets.

UNFUNDED ACTUARIAL ACCRUED LIABILITY

1. Unfunded Actuarial Accrued Liability (UAAL) as of December 31, 2018	\$	152,546,393
2. Employer Normal Cost, Developed as of December 31, 2018		6,652,950
3. Expected Interest on 1 and 2 (at 7.25%)		11,541,952
4. Contributions		6,990,639
5. Expected Interest on 4, mid-year		248,977
6. Expected UAAL as of December 31, 2019 (1)+(2)+(3)-(4)-(5)	\$	163,501,679
7. Change in UAAL by component		
Increase in UAAL due to investment experience	\$	172,546
Decrease in UAAL due to demographic experience		(1,934,964)
Decrease in UAAL due to favorable claims experience		(15,991,089)
Increase in UAAL due to updated health care trend rates		36,599,562
Increase in UAAL due to all other assumption changes		12,920,746
Net increase in UAAL		31,766,801
8. Unfunded Actuarial Accrued Liability as of December 31, 2019	\$	195,268,480

DEVELOPMENT OF ACTUARIALLY DETERMINED CONTRIBUTION

Valuation Date	12/31/2019
<i>Unfunded Actuarial Accrued Liability</i>	
Actuarial Accrued Liability	\$ 303,327,052
Actuarial Value of Assets	<u>108,058,572</u>
Unfunded Actuarial Accrued Liability	\$ 195,268,480
<i>Amortization Amount Component</i>	
Amortization Period	30
Amortization Method	Open
Discount Rate	7.25%
Payroll Growth Rate	3.00%
Total Amortization Amount	\$ 11,011,716
As of Percent of Covered Payroll	9.30%
<i>Normal Cost Component</i>	
Normal Cost	\$ 5,866,840
Interest on Normal Cost	<u>425,346</u>
Normal Cost Component	\$ 6,292,186
As of Percent of Covered Payroll	5.32%
<i>Development of Actuarially Determined Contribution</i>	
Normal Cost Component	\$ 6,292,186
As of Percent of Covered Payroll	5.32%
Amortization Component	\$ 11,011,716
As of Percent of Covered Payroll	9.30%
Actuarially Determined Contribution	\$ 17,303,902
As of Percent of Covered Payroll	14.62%
Covered Payroll	\$ 118,370,595

DEVELOPMENT OF ACTUARIALLY DETERMINED CONTRIBUTION

Determination of the Actuarially Determined Contribution for the Period July 1, 2020 to June 30, 2021	Contributions Expressed as a Percent of Payroll
Normal Cost	5.32%
UAAL Amortization	9.30%
Total Actuarially Determined Contribution	14.62%

The calculations above show the Employer's Actuarially Determined Contribution for the year ended June 30, 2021. The Actuarially Determined Contribution for the year ended December 31, 2020 will be ½ of 13.45% of covered payroll and ½ of the 14.62% of covered payroll shown above.

DEVELOPMENT OF ASSETS

STATEMENT OF FIDUCIARY NET POSITION			
December 31, 2019			
	MARKET VALUE		
	PENSION	HEALTH	TOTAL
ASSETS			
Total Cash and Equivalents	20,782,052	2,885,015	23,667,067
Receivables:			
Employer Contributions Receivable	2,133,669	0	2,133,669
Member Contributions Receivable	1,499,104	0	1,499,104
Accrued Investment Income	847,830	117,698	965,528
Total Receivables	4,480,603	117,698	4,598,301
Investments:			
Domestic Equity	274,878,455	37,675,276	312,553,731
International Equity	151,469,142	20,748,429	172,217,571
Fixed Income	140,112,205	19,193,104	159,305,309
Real Estate	58,400,615	7,999,939	66,400,554
Private Equity	106,588,264	14,600,867	121,189,131
Hedge Funds	61,201,154	8,383,567	69,584,721
Direct Infrastructure	6,397,963	876,417	7,274,380
Total Investments	799,047,798	109,477,599	908,525,397
Other	27,856	1,131	28,987
Total Assets	824,338,309	112,481,443	936,819,752
Deferred Outflows of Resources	400,615	48,815	449,430
LIABILITIES			
Payables:			
Accounts Payable	509,405	70,717	580,122
Accrued Payroll Liabilities	289,629	40,207	329,836
Accrued Pension Liabilities	4,772,146	0	4,772,146
Accrued Health Care Liabilities	0	808,109	808,109
Net Pension Liability	1,239,854	0	1,239,854
Net OPEB Liability	0	617,465	617,465
Total Liabilities	6,811,034	1,536,498	8,347,532
Deferred Inflows of Resources	68,402	7,382	75,784
Net Assets:			
Active and Retired Members' Equity	817,859,488	110,986,378	928,845,866
Employees' Savings Fund			89,911,182
Employer Accumulation Fund			110,986,378
Pension Reserve Fund			727,948,306
Survivors Benefit Fund			0
Health Care Fund			110,986,378
Income Fund			(110,986,378)
Total Fund Balance			928,845,866
NET POSITION			928,845,866

STATEMENT OF CHANGES IN FIDUCIARY NET POSITION FOR THE YEAR ENDED December 31, 2019 Market Value Basis			
	PENSION	HEALTH	TOTAL
ADDITIONS			
Contributions:			
Member Contribution	15,618,020	4,006,980	19,625,000
Employer Contributions	33,107,047	0	33,107,047
Medicare Part D Reimbursement		2,983,659	2,983,659
Transfers	634,717		634,717
Total Contributions	49,359,784	6,990,639	56,350,423
Net Investment Income ¹	129,802,232	18,006,553	147,808,785
Total Additions	179,162,016	24,997,192	204,159,208
DEDUCTIONS			
Distributions to Members:			
Benefit Payments	73,497,433	15,609,344	89,106,777
Refund of Member Contributions	1,556,151		1,556,151
Death Benefit	80,000		80,000
Total Distributions	75,133,584	15,609,344	90,742,928
Administrative Expenses	1,649,904	229,044	1,878,948
Total Deductions	76,783,488	15,838,388	92,621,876
Net Increase in Net Position	102,378,528	9,158,804	111,537,332
NET POSITION			
Beginning of the Year	715,480,960	101,827,574	817,308,534
End of the Year	817,859,488	110,986,378	928,845,866
Actuarial Value End of Year ²	796,284,462	108,058,572	904,343,034

¹ Investment related expenses include investment management, investment consulting, custodial and securities lending bank fees.

² Actuarial Value is allocated in proportion to the Market Value.

CASH FLOW PROJECTION

CASH FLOW PROJECTION BASED ON DECEMBER 31, 2019 ACTUARIAL VALUATION AT 7.25%										
Calendar Year	Fund Balance BOY \$	Employer Contributions \$	Benefits \$	Net \$	Investment Return %	Investment Return \$	Fund Balance EOY		% of Payroll	
							Nominal \$	Real \$	Contrib.	Benefits
2020	\$ 108,058,572	\$ 0.00	\$ 9,865,489	\$ (9,865,489)	7.25%	\$ 7,482,880	\$ 105,675,963	\$ 105,675,963	0.00%	8.02%
2021	105,675,963	0.00	11,769,543	(11,769,543)	7.25%	7,242,326	101,148,746	98,681,703	0.00%	9.15%
2022	101,148,746	0.00	12,364,596	(12,364,596)	7.25%	6,892,910	95,677,060	91,066,803	0.00%	9.33%
2023	95,677,060	0.00	13,074,746	(13,074,746)	7.25%	6,470,920	89,073,234	82,713,353	0.00%	9.59%
2024	89,073,234	0.00	14,767,171	(14,767,171)	7.25%	5,931,865	80,237,928	72,691,603	0.00%	10.70%
2025	80,237,928	0.00	16,033,907	(16,033,907)	7.25%	5,246,190	69,450,211	61,383,867	0.00%	11.26%
2026	69,450,211	0.00	17,633,510	(17,633,510)	7.25%	4,407,109	56,223,810	48,481,615	0.00%	11.66%
2027	56,223,810	0.00	17,809,025	(17,809,025)	7.25%	3,441,944	41,856,729	35,212,611	0.00%	11.28%
2028	41,856,729	0.00	18,972,809	(18,972,809)	7.25%	2,358,882	25,242,802	20,717,943	0.00%	11.50%
2029	25,242,802	0.00	20,562,049	(20,562,049)	7.25%	1,097,770	5,778,523	4,627,027	0.00%	11.90%
2030	5,778,523	0.00	23,239,221	(23,239,221)	7.25%	(408,740)	(17,869,438)	(13,959,576)	0.00%	12.84%

The above projection of the health care fund shows the fund will remain solvent until 2030. This is based on the following projection assumptions:

1. Actuarial assumptions and methods are as described in the Actuarial Assumptions and Funding Methods section of this report.
All future demographic experience is assumed to be exactly realized.
2. Assume a 0% increase in the total active member population. All new future members are expected to enter the plan upon their date of hire, under applicable plan provisions.
3. Employer contribution rates and benefit provisions continue at their present levels.
4. All cash flows are assumed to occur mid-year.
5. Inflation rate is 2.50% annually.

APPROXIMATE IRC SECTION 401(H) COMPUTATION

Year	(1)	(2) Pension			(5)	(6)	(7)	(8)	(9)
	Covered Pay	EAN NC %	PUC NC %	PUC NC \$	Health Contribution	(4) + (5)	Sum of (5)	Sum of (6)	IRC Ratio (7) / (8)
1999	\$ 69,030	24.96%	26.08%	\$ 18,003.0	\$ 3,278.9	\$ 21,281.9	\$ 33,616.4	\$ 216,929.5	15.5%
2000	68,505	24.96%	26.08%	17,866.1	3,254.0	21,120.1	36,870.4	238,049.6	15.5%
2001	74,140	23.10%	23.63%	17,519.3	3,521.7	21,041.0	40,392.1	259,090.6	15.6%
2002	79,594	23.14%	23.71%	18,871.7	3,780.7	22,652.4	44,172.8	281,743.0	15.7%
2003	80,641	21.88%	22.72%	18,321.6	3,395.7	21,717.3	47,568.5	303,460.3	15.7%
2004	81,931	21.91%	22.83%	18,704.8	2,867.6	21,572.4	50,436.1	325,032.7	15.5%
2005	85,828	21.68%	22.59%	19,388.5	3,006.4	22,394.9	53,442.5	347,427.6	15.4%
2006	87,563	20.99%	21.83%	19,115.0	3,384.8	22,499.8	56,827.3	369,927.4	15.4%
2007	95,032	20.78%	21.92%	20,831.0	4,575.1	25,406.1	61,402.4	395,333.5	15.5%
2008	93,029	20.81%	21.89%	20,364.0	4,668.0	25,032.0	66,070.4	420,365.5	15.7%
2009	93,339	21.21%	22.92%	21,393.3	4,794.7	26,188.0	70,865.1	446,553.5	15.9%
2010	92,226	21.23%	23.25%	21,445.7	3,699.8	25,145.5	74,564.9	471,699.0	15.8%
2011	92,790	21.72%	24.03%	22,297.8	2,418.4	24,716.2	76,983.3	496,415.2	15.5%
2012	96,022	21.80%	24.19%	23,227.8	2,553.0	25,780.8	79,536.3	522,196.0	15.2%
2013	100,250	18.23%	20.37%	20,418.9	4,718.7	25,137.6	84,255.0	547,333.6	15.4%
2014	100,569	18.13%	21.00%	21,117.3	5,859.3	26,976.6	90,114.3	574,310.2	15.7%
2015	101,751	18.13%	21.01%	21,375.1	5,637.4	27,012.5	95,751.7	601,322.7	15.9%
2016	112,811	19.70%	21.55%	24,305.2	5,944.6	30,249.8	101,696.3	631,572.5	16.1%
2017	116,038	19.73%	21.18%	24,574.0	6,777.8	31,351.8	108,474.1	662,924.3	16.4%
2018	115,613	19.10%	20.50%	23,700.0	7,784.3	31,484.3	116,258.4	694,408.6	16.7%
2019	118,371	20.04%	22.86%	27,062.1	2,983.7	30,045.8	119,242.1	724,454.4	16.5%

As shown in the above table, the retiree health plan is subordinate to the pension plan in the trust based on the 25% threshold requirement for Column 9. Therefore, the calculations shown above indicate compliance with IRC Section 401(h).

PER CAPITA CLAIMS COSTS AND CONTRIBUTION AMOUNTS

Development of Health Care Rates

Medical and Prescription Drug Costs:

The per capita claims costs were developed based on the most recent 36-month Medical Mutual of Ohio and Express Scripts claims and enrollment experience. Additionally, the administrative and stop-loss fees charged by Medical Mutual of Ohio and the Aetna Medicare Advantage premium rates effective January 1, 2020 were used to establish the cost. Members and their spouses who are eligible for Medicare have a reduction to their cost due to retiree drug subsidies and prescription drug rebates.

The following rates were based on the retired life data as of the valuation date and are representative of the Plan's portion of the total care cost:

Member and Spouse Monthly Medical and Prescription Drug Cost		
Age	Male	Female
40	\$ 360.97	\$ 589.16
45	447.47	623.71
50	584.37	726.74
55	766.80	846.61
60	987.83	987.45
65	440.67	401.33
70	480.05	448.53
75	515.59	485.78
80	541.27	513.49
85	545.21	532.63
90	535.11	537.97
95	527.70	516.38

The dependent child per capita cost is \$283.56 per month for each child in calendar year 2020.

Dental Benefits:

Dental coverage under the Delta Dental PPO (Point-of-Service) plan is available to eligible retirees and their dependents. The premium rates shown below are effective January 1, 2020 through December 31, 2020. The rates represent the full cost of coverage as of the valuation date.

Delta Dental Monthly Premium Rates Calendar Year 2020	
Member Only	\$ 25.89
Member and Spouse	\$ 50.19
Member, Spouse, and Child	\$ 85.73
Member and Child	\$ 53.04

Vision Benefits:

Vision coverage under the Aetna Vision Preferred Plan – Under 65 and the Aetna Vision Preferred Plan – Over 65 is available to eligible retirees and their dependents and is based on whether they are ineligible or eligible for Medicare, respectively. The premium rates shown below are effective January 1, 2020 through December 31, 2020. The rates represent the full cost of coverage as of the valuation date.

Aetna Vision Preferred Plan Premium Rates Calendar Year 2020	
Over Age 65	
Member Only	\$ 5.27
Member and Spouse	\$ 10.50
Member, Spouse, and Child	\$ 14.61
Member and Child	\$ 9.20
Under Age 65	
Member Only	\$ 7.63
Member and Spouse	\$ 15.22
Member, Spouse, and Child	\$ 21.17
Member and Child	\$ 13.32

PARTICIPANT DATA

Summary of All Participants

Participant Group	Number
Retirees and surviving spouses who are currently receiving benefits	1,479
Retirees and surviving spouses who are not currently receiving benefits, but may enroll in coverage in the future	219
Inactive plan members who are entitled to, but not currently receiving benefits	11
Active members (including DROP participants)	<u>1,614</u>
Total	3,323

Summary of Current Inactive Participants

Summary of Current Inactives Health Plan Enrollment Election						
AS OF December 31 st	Inactives Currently Enrolled ³				Inactives That May Enroll in the Future	
	Medical	Vision	Dental	Total Number Enrolled	Vested Term	All Other Inactives
2019	1,329	1,455	1,449	1,479	11	219

³ The number of lives was compiled from data files provided by HPRS Staff. This is the number of retired members covered and will differ from the number of actual lives covered based on the type of coverage elected, as shown in the two exhibits that follow.

Number of Retired Lives Covered by Medical Mutual, AETNA, and Medicare Advantage												
	Census Date											
	12/19	12/18	12/17	12/16	12/15	12/14	12/13	12/12	12/11	12/10	12/09	12/08
Recipients:												
w/o Medicare A	499	546	606	654	685	645	672	702	NA	732	692	762
Medicare A	894	874	841	821	780	753	717	669	NA	596	580	398
Spouses:												
w/o Medicare A	207	217	253	287	302	325	330	355	NA	365	368	518
Medicare A	451	434	402	386	372	360	338	305	NA	257	267	232
Dependent Children	98	104	208	251	261	273	302	279	NA	216	165	167
Orphans	0	0	0	0	0	0	0	0	NA	0	23	26
Totals	2,149	2,175	2,310	2,399	2,400	2,356	2,359	2,310	2,269	2,166	2,095	2,103

Summary of Recipients and Dependents Covered by Medical Mutual, AETNA, and Medicare Advantage				
As of December 31 st	AETNA	Medicare Advantage	Medical Mutual	Totals
2009	1,260		835	2,095
2010	190	819	1,157	2,166
2011	197	891	1,181	2,269
2012	183	975	1,152	2,310
2013	162	1,056	1,141	2,359
2014	0	1,114	1,242	2,356
2015	0	1,152	1,248	2,400
2016	0	1,207	1,192	2,399
2017	0	1,244	1,066	2,310
2018	0	1,259	866	2,125
2019	0	1,290	803	2,093

Summary of Current Active and DROP Participants

Actives Service									
Age	Total Past Service								Total
	< 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 +	
<25	18	84	0	0	0	0	0	0	102
25 - 29	13	195	72	0	0	0	0	0	280
30 - 34	5	51	147	17	0	0	0	0	220
35 - 39	0	21	55	84	65	2	0	0	227
40 - 44	0	1	15	44	135	94	2	0	291
45 - 49	0	0	2	18	63	125	60	0	268
50 - 54	0	0	0	1	24	26	6	0	57
55 - 59	0	0	0	0	1	0	1	0	2
60 - 64	0	0	0	0	0	0	0	0	0
Total	36	352	291	164	288	247	69	0	1,447

DROPs Service									
Age	Total Past Service								Total
	< 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 +	
<25	0	0	0	0	0	0	0	0	0
25 - 29	0	0	0	0	0	0	0	0	0
30 - 34	0	0	0	0	0	0	0	0	0
35 - 39	0	0	0	0	0	0	0	0	0
40 - 44	0	0	0	0	0	0	0	0	0
45 - 49	0	0	0	0	0	0	35	0	35
50 - 54	0	0	0	0	0	5	75	17	97
55 - 59	0	0	0	0	0	8	13	14	35
60 - 64	0	0	0	0	0	0	0	0	0
Total	0	0	0	0	0	13	123	31	167

Actives & DROPs Combined Service									
Age	Total Past Service								Total
	< 1	1 - 4	5 - 9	10 - 14	15 - 19	20 - 24	25 - 29	30 +	
<25	18	84	0	0	0	0	0	0	102
25 - 29	13	195	72	0	0	0	0	0	280
30 - 34	5	51	147	17	0	0	0	0	220
35 - 39	0	21	55	84	65	2	0	0	227
40 - 44	0	1	15	44	135	94	2	0	291
45 - 49	0	0	2	18	63	125	95	0	303
50 - 54	0	0	0	1	24	31	81	17	154
55 - 59	0	0	0	0	1	8	14	14	37
60 - 64	0	0	0	0	0	0	0	0	0
Total	36	352	291	164	288	260	192	31	1,614

ACTUARIAL ASSUMPTIONS AND FUNDING METHODS

<u>Valuation Date</u>	December 31, 2019.
<u>Fiscal Year End</u>	December 31, 2019.
<u>Interest Rate</u>	7.25%
<u>Mortality Rates</u>	<p><i>Healthy Active Lives:</i> PubS-2010 (amount-weighted) employee tables.</p> <p><i>Retiree and Vested Terminated Lives:</i> PubS-2010 (amount-weighted) healthy retiree tables adjusted by 94%.</p> <p><i>Contingent Survivor Lives:</i> PubS-2010 (amount-weighted, above-median) contingent survivor tables adjusted by 105%.</p> <p><i>Disabled Lives:</i> PubS-2010 (amount-weighted) disabled retiree tables.</p> <p>The mortality assumptions for all participants are sex distinct with mortality improvement projected 5 years beyond the valuation date using scale MP-2019 and a base year of 2010. We feel these assumptions sufficiently accommodate anticipated future mortality improvements. Previously, RP-2014 Mortality Tables for males and females, adjusted for mortality improvement back to the observation period base year of 2006. The base year for females was then established to be 2012. Mortality rates for a particular calendar year are determined by applying the MP-2018 mortality improvement scale to the above described tables.</p>
<u>Inflation</u>	2.50%

Salary Increase Rates

Years of Service	Total Increase (Next Year)
0-1	13.50%
2-3	9.50%
4-5	8.00%
6-11	5.00%
12+	3.80%

Retirement Rates

Age	Retirement Rates	
	Normal	Reduced
48	20.00%	5.00%
49-50	15.00%	5.00%
51	15.00%	10.00%
52	20.00%	
53	10.00%	
54	20.00%	
55	30.00%	
56-59	40.00%	
60+	100.00%	

Termination Rates

Years of Service	Annual Rate of Withdrawal
0	13.00%
1-2	6.50%
3-5	4.50%
6-9	2.50%
10-20	1.00%
21+	2.50%

Disability Rates

Age	Annual Rate of Disability
20	0.06%
25	0.06%
30	0.17%
35	0.32%
40	0.53%
45	0.64%
50	0.85%
55	1.00%
60+	0.00%

Health Care Inflation

The assumed annual rates of increase in retiree expected health care claims costs and contribution during each period subsequent to the valuation date were adopted as of December 31, 2019.

Medical

Fiscal Year Beginning January 1	Pre-Medicare Medical and Prescription Drug Plan	Medicare Advantage Plan
2020	7.75%	5.75%
2021	7.70%	5.70%
2022	7.65%	5.65%
2023	7.50%	5.60%
2024	7.25%	5.45%
2025	6.80%	5.25%
2026	6.25%	5.05%
2027	5.70%	4.90%
2028	5.25%	4.85%
2029	5.00%	4.80%
2030	4.85%	4.75%
2031	4.80%	4.75%
2032	4.75%	4.75%
2033+	4.75%	4.75%

Dental

4.00% for every year

Vision

3.25% for every year

Health Care Participation Rates

Future Retirees

See Table 1 (adopted December 31, 2019), on the following page, which contains annual health care coverage election rates based on member ages.

Current Retirees

Actual health care coverage elections for all current retirees and surviving spouses are used during the fiscal period that immediately follows the valuation date (initial year). After the initial year, current retirees and surviving spouses are assumed to elect health care coverages based on the annual rates provided in Table 1.

Future Spouses of Retirees

See Table 1 (adopted December 31, 2019), which contains annual health care coverage election rates based on member ages.

Current Spouses of Retirees

Actual health care coverage elections for all spouses of retirees are used during the fiscal period that immediately follows the initial year. After the initial year, spouses are assumed to elect health care coverages based on the annual rates provided in Table 1.

Dependent Children

Of Current Actives

Members who receive a death-in-service benefit are assumed to have two children for whom medical and prescription drug, dental, and vision coverage is maintained for a period of 10 years following the active employee's death. Otherwise, future retirees are not expected to enroll any children for coverage when they retire, withdraw, or become disabled.

Of Current Inactives

All current retirees who are enrolled in a member plus child(ren) or member plus family coverage tier are expected to cover one child to two children, respectively, for 10 years beginning on the member's date of retirement. Otherwise, current retirees are not expected to enroll any children during any future period.

Spousal Age Difference

Actual spouse age and gender is used where available, otherwise, spouse of male member is assumed to be 3 years younger than member; Spouse of female member assumed to be 3 years older than member. Members are assumed to be married to the opposite gender.

TABLE 1				
Member Attained Age	Medical / Rx Annual Member Election Rate	Medical / Rx Annual Spouse Coverage Rate	Dental / Vision Annual Member Election Rate	Dental / Vision Annual Spouse Coverage Rate
Under 48	0.600	0.000	0.600	0.000
48	0.550	0.450	0.700	0.450
49	0.500	0.450	0.650	0.500
50	0.500	0.450	0.600	0.550
51	0.525	0.450	0.600	0.550
52	0.650	0.450	0.700	0.550
53	0.675	0.400	0.725	0.500
54	0.700	0.350	0.750	0.400
55	0.725	0.400	0.775	0.475
56	0.775	0.425	0.825	0.525
57	0.800	0.450	0.850	0.550
58	0.825	0.500	0.875	0.575
59	0.850	0.550	0.900	0.600
60	0.850	0.575	0.900	0.600
61	0.850	0.575	0.900	0.625
62	0.875	0.575	0.925	0.650
63-64	0.900	0.575	0.950	0.650
65-66	0.900	0.625	0.975	0.650
67	0.950	0.625	0.975	0.650
68-69	0.950	0.650	0.975	0.675
70	0.950	0.675	0.975	0.700
71	0.950	0.700	0.975	0.725
72	0.975	0.725	0.975	0.750
73	0.975	0.750	0.975	0.775
74	0.975	0.725	0.975	0.750
75	0.975	0.700	0.975	0.700
76	0.950	0.675	0.950	0.650
77-79	0.925	0.675	0.925	0.650
80-81	0.925	0.725	0.925	0.700
82	0.900	0.700	0.900	0.650
83	0.900	0.650	0.900	0.600
84	0.875	0.600	0.875	0.550
85 +	0.800	0.550	0.850	0.450
Disabled Pre-65	0.750	0.400	0.750	0.400
Disabled Post-64	0.950	0.550	0.950	0.550

<u>Medicare Eligible Enrollment</u>	100% of current and future retirees and their dependents are assumed to be eligible for, and enroll in, Medicare when they reach age 65.
<u>Medical Aging (Morbidity) Factors</u>	Developed based on a study performed by Dale Yamamoto for the Society of Actuaries. Used to measure the annual increases in per capita claim costs for each age and relative cost by gender. See the SOA report titled “Health Care Costs – From Birth to Death” for more details.
<u>Medical and Prescription Drug Claims</u>	The per capita claims cost development reflects the most recent 36-month Plan claims and enrollment experience, as well as current administrative fees, stop-loss fees, and Medicare Advantage premium rates.
<u>Actuarial Cost Method</u>	Entry Age Normal (Level Percentage of Pay), with costs allocated on basis of earnings. Actuarial gains and losses are reflected in the unfunded actuarial liability.
<u>Actuarial Asset Method</u>	Market value of assets adjusted by the unrecognized investment gains and losses for each of the four years prior to the valuation date. Gains and losses are recognized at a rate of 25% per year. Actuarial Assets shall not be less than 80% nor greater than 120% of Market Value of Assets.
<u>Payroll Growth</u>	3.00% for purposes of amortizing the Unfunded Actuarial Accrued Liability.
<u>Administrative Expenses</u>	\$216,428 annually, based on the average of actual expenses incurred in the prior two fiscal years.
<u>DROP Duration</u>	5 years
<u>DROP Election</u>	15% of active member eligible for unreduced retirement/DROP do not enter DROP or retire in any given year prior to age 60. Previously, it was assumed that members eligible to DROP would either retire or “DROP in” at first eligibility for unreduced retirement.
<u>Source of Data</u>	Data and audited financial information is provided by the Fund.

Changes in Funding Assumptions/Methods Since the Prior Valuation

Method Changes

- Decrement timing was changed from middle-of-year to beginning-of-year to be consistent with the decrement timing assumption used in the measurement of retirement plan obligations; and,
- Foster & Foster, Inc. was retained as the Plan's actuary for the actuarial valuation to be performed as of December 31, 2019, and to prepare the Plan's financial accounting results for the measurement period ending December 31, 2019. As a result, these measurements reflect the changes in miscellaneous assumptions and methods – including but not limited to rounding conventions, valuation approaches, and calculation techniques – that are typical in situations involving a transition of actuarial service providers.

Assumption Changes

The valuation reflects the following assumption changes to better reflect anticipated experience.

These changes were based on an experience study performed May 20, 2020:

- Retirement Rates: There was a slight adjustment to the assumed rates of unreduced normal and reduced early retirement. Due to the mandatory retirement age based on Ohio Revised Code 5505.16(C), the 100% retirement assumption at age 60 was maintained, however, based on actual experience, the 100% retirement assumption of eligible members age 55 and older with 34 or more years of service was removed.
- Withdrawal Rates: There was a slight increase to the withdrawal rates.
- Disability Rates: There was a slight decrease to the disability rates and an increase in the percentage of disabilities assumed to be service-incurred from 50% to 55%.
- Mortality Rates: The RP-2014 Combined mortality rates has been updated to the following as well as the mortality improvement projection scale to MP-2019:
 - Active members – PubS-2010 (amount-weighted) employee tables
 - Retirees/VTs – PubS-2010 (amount-weighted) healthy retiree tables adjusted by 94%
 - Survivors – PubS-2010 (amount-weighted, above-median) contingent survivor adjusted by 105%
 - Disabled – PubS-2010 (amount-weighted) disabled retiree tables

- **Salary Increase:** The change in the salary increase rates reflects a higher increase at many service points.
- **DROP Experience:** This valuation assumes an increase from 0% to 15% of active members eligible for unreduced retirement/DROP do not enter the DROP or retire in any given year prior to age 60.
- **Administrative Expense Assumption:** The assumed expense load is based on the average of the actual expenses incurred in the prior two years instead of being a fixed rate.
- **Medical/Rx and Dental/Vision Election, and Spouse Coverage Assumptions** used in the measurements of the Plan's obligations.
- **Health care inflation rates** have been updated to reflect recent healthcare trend surveys in conjunction with actual plan experience.

SUMMARY OF PLAN PROVISIONS

The following describe and reflect provisions in effect as described in Chapter 5505 of the Ohio Revised Code.

Membership Eligibility

All sworn officers and cadets in training at the academy are required to become members of the retirement system. The beginning date of membership in the system for sworn officers hired prior to June 30, 1991, is the commission date. All cadets entering the academy after that date become members of OHPRS upon entering the academy. Any person hired prior to November 2, 1989, in the radio division are HPRS members. The beginning date of membership of the radio division member is the date of hire.

Credited Service

Total years, or part thereof, employed with OHPRS, purchased service credit, and any additional service credit approved by the Board.

Eligibility for Pension

Normal Retirement

Age 52 and 20 years of Credited Service, or Age 48 with 25 years of Credited Service if hired prior to January 1, 2020.

Early Retirement

Age 48 through 51 and has accumulated at least 20 years but less than 25 years of Credited Service.

Disability Benefit

Total and permanent as determined by the Board of Trustees incapacitated for in the line of duty, or 5 or more years of service for disability incurred off-duty.

Survivor Benefit

A surviving spouse is considered to be the wife or husband as set forth in a statutory valid certificate of marriage or as recognized by judgment of a court. A surviving child is considered to be the child by birth or the legally adopted child of the member or retiree.

DROP

The DROP program was established in 2006 and affords eligible members a one-time election to “DROP in” upon attainment of unreduced retirement eligibility.

Vesting (Termination)

15 or more years of credit service.

Eligibility for OPEB

Eligibility is the same as the conditions set forth to be eligible for Pension benefits, but for Vesting (Terminated) employees, he/she must have 20 years of Credited Service.

Eligible retirees who elect to enroll in a coverage option or continue health care coverage under the Plan contribute a monthly amount based on the selected coverage tier during the enrollment process.

Monthly Contributions

The following tables provide the monthly health care contributions for retiree and dependent coverage options during the period January 1, 2020 through December 31, 2020:

Monthly Contribution Amounts for Medical / Prescription Drug Coverage				
	Retiree ⁴	Spouse	Surviving Spouse	Dependent Child
Medicare Ineligible				
Ages Under 52	\$ 691	\$ 746	\$ 691	\$ 138 per Child
Ages 52–55	\$ 440	\$ 495	\$ 440	\$ 138 per Child
Ages 56–59	\$ 226	\$ 281	\$ 226	\$ 138 per Child
Ages Over 59	\$ 160	\$ 215	\$ 160	\$ 138 per Child
Medicare Eligible	\$ 40	\$ 195	\$ 110	\$ 138 per Child

Monthly Contribution Amounts for Dental and Vision Coverage				
	Retiree	Spouse	Surviving Spouse	Dependent Child(ren)
Dental	\$ 5	\$ 20	\$ 5	\$ 5
Vision	\$ 5	\$ 5	\$ 5	\$ 5

Changes in Fund Provisions Since the Prior Valuation

- None

⁴ Disabled retirees who are receiving In-the-Line-of-Duty benefits contribute the age 60+ amount. Not-In-the-Line-of-Duty (Off-Duty) disabled retirees contribute amounts based on actual age.

GLOSSARY OF ACTUARIAL TERMS

Actuarial Present Value is the amount or series of amounts payable or receivable at various times, determined as of a given date by the application of a particular set of Actuarial Assumptions. For purposes of this standard, each such amount or series of amounts is:

1. adjusted for the probable financial effect of certain intervening events
2. multiplied by the probability of the occurrence of an event (such as survival, death, disability, termination of employment, etc.) on which the payment is conditioned, and
3. discounted according to an assumed rate (or rates) of return to reflect the time value of money.

Actuarial Cost Method is a procedure for determining the Present Value of plan benefits and expenses and for developing an actuarially equivalent allocation of such value to time periods, usually in the form of a Normal Cost and an Actuarial Liability.

Total Annual Payroll is the annual rate of pay for the fiscal year prior to the valuation date of all covered members.

Present Value of Benefits is the single sum value on the valuation date of all future benefits to be paid to current Members, Retirees, Beneficiaries, Disability Retirees and Vested Terminations.

Normal (Current Year's) Cost is the portion of the Actuarial Present Value of plan benefits and expenses which is allocated to a valuation year by the Actuarial Cost Method.

Actuarial Accrued Liability is the portion, as determined by a particular Actuarial Cost Method, of the Actuarial Present Value of plan benefits and expenses which is not provided for by future Normal Costs.

Unfunded Actuarial Accrued Liability (UAAL) is a liability which arises when a plan is initially established or improved and such establishment or improvement is applicable to all years of past service. Under the Entry Age Normal Actuarial Cost Method, there is also a new UAAL created each year equal to the actuarial gain or loss for that year.

Actuarially Determined Contribution (ADC) represents the level of employer contribution effort that would be required on a sustained, ongoing basis to:

1. fund the Normal Cost (cost associated with new services received) each year and
2. amortize the total unfunded actuarial liabilities (or funding excess) attributed to past services over a period of time (as determined by the plan sponsor, but typically no more than thirty years).

The ADC is a basis for the allocation of the employer's projected cost of providing Other Post-Employment Benefits (OPEB) over periods that approximate the periods in which the employer receives services from the covered employees. Accordingly, the ADC may be used as the foundation on which the measurement of the employer's annual funding can be based.