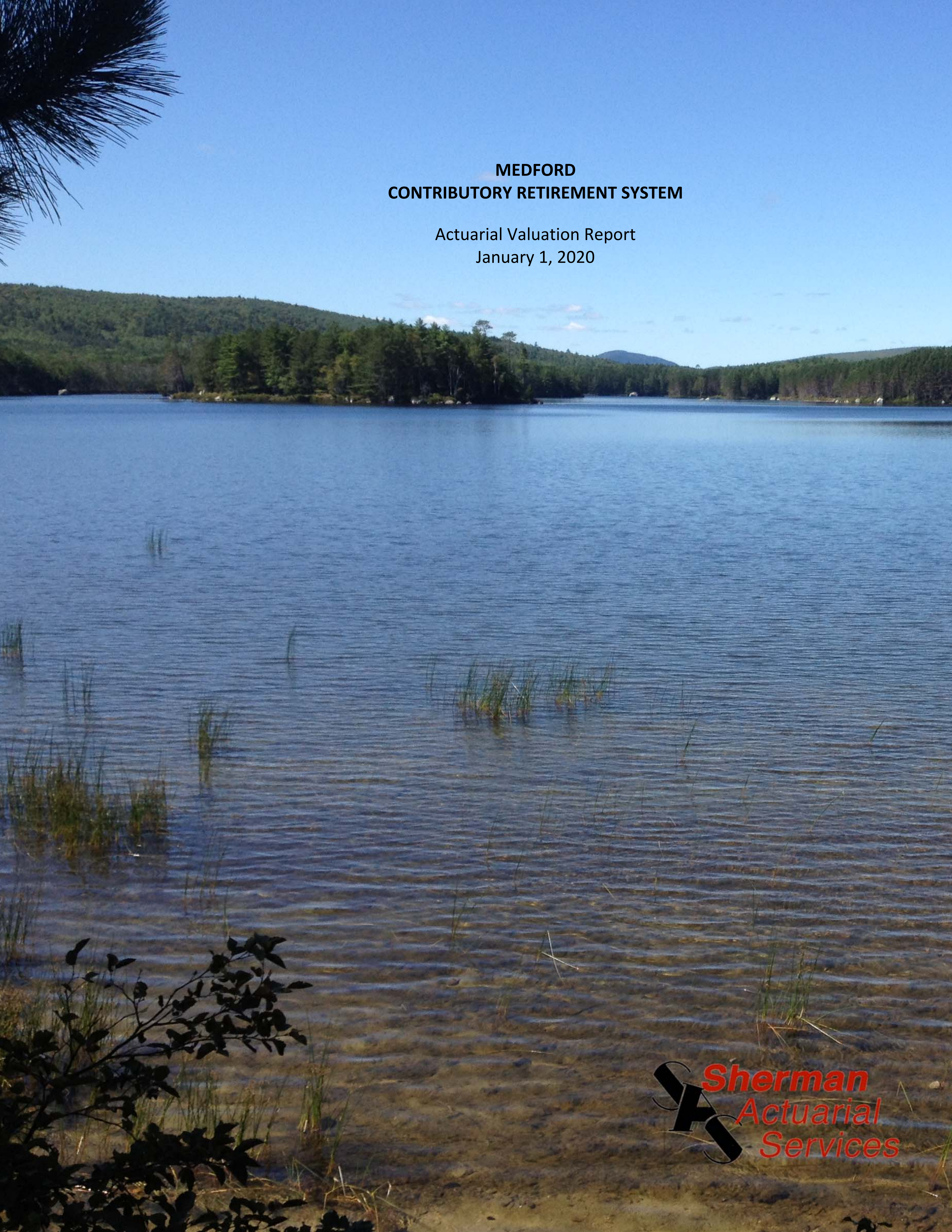
MEDFORD
CONTRIBUTORY RETIREMENT SYSTEM

Actuarial Valuation Report
January 1, 2020



Sherman Actuarial Services

TABLE OF CONTENTS

Report Summary:

Highlights	**January 1, 2018**	**January 1, 2020**
Contributions		
Funding Schedule FY 2021	$12,989,190	$12,989,190
Funding Schedule FY 2022	13,768,541	14,028,325
Funded Ratios		
GAS No. 25	68.1%	61.3%
Participants		
Actives	733	776
Retirees and Beneficiaries	475	487
Inactives	189	203
Disabled	119	120
Total	1,516	1,586
Payroll		
Payroll of Active Members	$41,033,141	$46,003,072
Average Payroll	55,980	59,282
Normal Cost		
Employer	$2,554,878	$2,866,822
Employee	3,561,080	4,085,550
Administrative Expenses	425,000	425,000
Total	$6,540,958	$7,377,372
Actuarial Accrued Liabilities		
Actives	$118,666,116	$133,567,594
Retirees, Beneficiaries, Disabilities and Inactives	168,288,034	201,393,976
Total	$286,954,150	$334,961,570
Actuarial Value of Assets	$195,355,103	$205,456,666
Unfunded Actuarial Accrued Liabilities	$91,599,047	$129,504,904

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2020, the Medford Contributory Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2020.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Medford Retirement System
- Actuarial assumptions approved by the Retirement Board

The valuation and appropriation forecast are prepared in accordance with Chapter 32 of the M.G.L. as of January 1, 2020.

The valuation and forecast do not account for:

- Any subsequent changes in the law
- Chapter 32 of the M.G.L., Section 3(8)(c) transfers between systems
- State-mandated benefits
- Cost-of-living increases granted to retired members between 1982 and 1997. The cost of these benefits has been assumed by the State under Proposition Two and One-Half.

Actuarial Experience

In performing the actuarial valuation, various assumptions are made regarding such factors as mortality, retirement, disability, and withdrawal rates as well as both payroll, salary increases, and investment returns. A comparison of the current valuation and the prior valuation is made to determine how closely actual experience corresponded to anticipated occurrences. This analysis of the system provides insight into the overall quality of the actuarial assumptions and helps explain any change in the annual appropriation.

During the last two years, based on the 2018 actuarial assumptions and plan provisions, the total unfunded actuarial accrued liability increased by 14.69% to $105,057,408. The increase is the result of contributions to the trust and net unfavorable actuarial experience during the preceding years. The sources of actuarial (gains) and losses are as follows:

Assets	10,914,189
Salary Increases	4,264,673
New Participants	1,771,530
Retirements	(4,288,606)
Terminations	(52,777)
Death while active	267,557
Disabled while active	178,937
Inactive Mortality and data	7,350,473
Benefit Payments	1,605,112
Other	1,492,196
Total (Gain) / Loss	23,503,283

In addition, the actuarial assumptions were changed by lowering the assumed rate of return to 7.25% and adopting new mortality assumptions. The changes added $24,447,496 to the unfunded liability and $463,959 to the employer portion of the Normal Cost.

Actuarial Costs and Liabilities:

Normal Costs

The normal cost is the sum of the individual normal costs determined for each member as if the assumptions underlying the cost determinations had been exactly realized. An individual normal cost represents that part of the cost of a member's future benefits which are assigned to the current year as if the costs are to remain level as a percentage of the member's pay. Benefits payable under all circumstances (i.e., retirement, death, disability, and terminations) are included in this calculation. Anticipated employee contributions to be made during the year are subtracted from the total normal cost to determine employer normal cost. The total normal cost is divided by total payroll to determine the normal cost as a percent of pay. The normal cost is shown in Table I.

Table I

	January 1, 2018	January 1, 2020
Superannuation	$4,139,319	$4,850,268
Termination	837,714	928,817
Death	288,267	197,989
Disability	850,658	975,298
Administrative Expenses	$425,000	$425,000
Total Normal Cost	$6,540,958	$7,377,372
% of Pay	15.9%	16.0%
Employee Contributions	$3,561,080	$4,085,550
% of Pay	8.7%	8.9%
Employer Normal Cost	$2,979,878	$3,291,822
% of Pay	7.3%	7.2%

Present Value of Actuarial Accrued Liabilities

The actuarial accrued liabilities (AAL) represents today's value of all benefits based on the past service of the actives and inactives. The AAL can be compared to the assets to determine the funded status of the Plan. The value of these earned benefits is shown in Table II below.

Table II

	January 1, 2018	January 1, 2020
Actives		
Superannuations	$114,374,283	$129,893,190
Termination	(2,304,414)	(2,572,245)
Death	3,009,552	1,901,955
Disability	3,586,695	4,344,694
Retirees and Inactives		
Retirees and Beneficiaries	$117,547,393	$141,008,789
Terminated (Refund)	1,383,144	1,517,753
Disabled	49,357,497	58,867,434
Total	$286,954,150	$334,961,570

Present Value of Future Benefits

The present value of future benefits represents today's value of all benefits earned by the inactive participants as well as all benefits earned and expected to be earned in the coming years by the active participants. The difference between the present value of future benefits and the present value of actuarial accrued liabilities is the value of benefits to be earned in the coming years. The value of the total expected benefits is shown in Table III.

Table III

	January 1, 2018	January 1, 2020
Actives		
Superannuation	$144,103,551	$166,772,849
Termination	3,932,736	4,814,159
Death	5,041,387	3,495,222
Disability	10,512,738	12,986,634
Retirees and Inactives		
Retirees and Beneficiaries	$117,547,393	$141,008,789
Terminated (Refund)	1,383,144	1,517,753
Disabled	49,357,497	58,867,434
Total	$331,878,446	$389,462,840

Funded Status and Appropriations:

Market Value of Plan Assets

The trust fund composition on a market value basis is shown in Table IV.

Table IV

	January 1, 2018	January 1, 2020
Cash equivalents	$3,656,453	$2,089,354
Short term investments	0	0
Fixed income securities	39,585,995	57,696,946
Equities	42,670,636	54,631,895
International	58,302,748	51,194,578
Real Estate	13,580,984	15,778,943
Venture Capital	0	0
Other	37,821,759	26,138,752
Accounts receivable	156,754	182,713
Accounts payable	(2,006,651)	(775,391)
Accrued income	92,806	121,032
Total Market Value	$193,861,484	$207,058,822
Total Actuarial Value	$195,355,103	$205,456,666

Actuarial Value of Assets

The actuarial value of assets is determined by projecting the market value of assets as of the beginning of the prior plan year with the assumed rate of return during that year (7.5%) and accounting for deposits and disbursements with interest at the assumed rate of return. An adjustment is then applied to recognize the difference between the actual investment return and expected return over a five year period. This preliminary actuarial value is not allowed to differ from the market value of assets by more than 15%. The calculation of the actuarial value of assets as of January 1, 2020 is presented in Table V.

Table V

		January 1, 2020
(1)	Market value at January 1, 2019	$184,012,021
(2)	2019 Contributions	$17,953,232
(3)	2019 Payments	($22,190,906)
(4)	Net interest adjustment at 7.5% on (1), (2), and (3) to December 31, 2019	$13,641,989
(5)	Expected market value on January 1, 2020 (1) + (2) + (3) + (4)	$193,416,336
(6)	Actual market value on January 1, 2020	$207,058,822
(7)	2019 (Gain) / Loss	($13,642,486)
(8)	80% of 2019 (Gain) / Loss	($10,913,989)
(9)	2018 (Gain) / Loss	$19,741,692
(10)	60% of 2018 (Gain) / Loss	$11,845,015
(11)	2017 (Gain) / Loss	($8,535,808)
(12)	40% of 2017 (Gain) / Loss	($3,414,323)
(13)	2016 (Gain) / Loss	$4,405,707
(14)	20% of 2016 (Gain) / Loss	$881,141
(15)	Actuarial value on January 1, 2020, (6) + (8) + (10) + (12) + (14)	$205,456,666
	but not less than 85% nor greater than 115% of (6)	$205,456,666
(16)	Ratio of actuarial value to market value	99.23%
(17)	Actuarial Value Return for 2018	4.16%
(18)	Actuarial Value Return for 2019	5.48%
(19)	Market Value Return for 2018	-2.80%
(20)	Market Value Return for 2019	15.00%

Unfunded Actuarial Accrued Liabilities

Under the Entry Age Normal Actuarial Cost Method, the Actuarial Accrued Liability represents what the accumulated assets would have been as of the valuation date if:

- current plan provisions and assumptions had always been in effect,
- experience conformed exactly to assumptions, and
- the normal cost had been contributed each year since inception.

The actuarial value of the Fund's assets as of the end of the prior year are subtracted from the Actuarial Accrued Liability (AAL) to determine the Unfunded Actuarial Accrued Liability (UAAL) as of the valuation date. Over time, annual pension contributions will accumulate Plan assets equal to the AAL, and the UAAL will be eliminated. Thereafter, annual contributions equal to the normal cost will keep the Plan's assets and liabilities in balance. The UAAL is developed in Table VI.

Table VI

	January 1, 2018	January 1, 2020
Actuarial Accrued Liability	$286,954,150	$334,961,570
Actuarial Assets	195,355,103	205,456,666
Unfunded Actuarial Accrued Liability	$91,599,047	$129,504,904
Funded Status	68.1%	61.3%

Appropriations

The pension appropriation for the upcoming fiscal years have been calculated in accordance with the requirements set forth in Sections 22D and 22F of Chapter 32 of the Massachusetts General Laws. These amounts were calculated to comply with the June 30, 2040, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Employer normal cost,
- Increasing amortization of the unfunded actuarial accrued liability by June 30, 2032
  $ 127,851,545 over 12 years with 4.0% increasing payments
- Level amortization of the 2002 Early Retirement Incentive by June 30, 2026
  $ 40,019 over 6 years
- Increasing amortization of the Funding Holiday by June 30, 2023
  $ 1,452,022 over 3 years with 4.5% increasing payments
- Level amortization of the 2010 Early Retirement Incentive by June 30, 2022
  $ 161,318 over 2 years
- Interest adjustment for payments deposited on July 1st.

The pension appropriation is shown in Table VII. The Board approved a limit of 8% on annual increases.

Table VII

	January 1, 2018	January 1, 2020
Normal cost	$2,979,878	$3,291,822
Amortization payment of the unfunded accrued liability	8,295,153	12,548,132
Amortization payment of 2002 ERI liability	7,931	7,889
Amortization payment of 2010 ERI liability	83,575	83,481
Amortization payment of Funding Holiday and ERI	455,822	496,632
Total cost	$11,822,359	$16,427,956
% of Pay	28.8%	35.7%
Fiscal 2021 cost	$12,989,190	$12,989,190
Fiscal 2022 cost	$13,768,541	$14,028,325

Appropriation Forecast

The following exhibit forecasts employer and employee contributions over the next 32 years under the adopted funding schedule.

Note that the forecast is based upon an "open group" method. This method assumes that sufficient employees will be hired each year to keep the number constant. The total payroll of the system is expected to increase 3.5% per year. The employee contribution rate is expected to increase to 10.5% by 2037 as members contributing base percentages 5%, 7%, and 8% are replaced by new members, whose base contribution is 9%. Payments are assumed to be made at the beginning of the year.

The employer total cost is expected to increase during the next 12 years until the unfunded liabilities are substantially paid off, at which time only the normal cost will remain. The total cost represents about 29% of payroll initially, increasing to about 45% until the time the unfunded liabilities are fully paid off, leaving only a normal cost of about 6% thereafter. The decrease in the employer Normal Cost as a percentage of payroll is a result of the increase in member deductions.

Appropriation Forecast

Fiscal Year Ending	Employee Contribution	Employer Normal Cost with Interest	Amortization Payments with Interest	Employer Total Cost with Interest	Employer Total Cost % of Payroll	Unfunded Accrued Liability	Funded Ratio %**
2021	$4,085,550	$3,409,063	$9,580,127	$12,989,190	28.2	$133,528,764	60.1
2022	$4,273,888	$3,481,421	$10,546,904	$14,028,325	29.5	$129,121,096	62.4
2023	$4,470,404	$3,554,669	$11,595,923	$15,150,592	30.7	$127,692,619	63.8
2024	$4,675,442	$3,628,780	$12,733,859	$16,362,639	32.1	$125,053,149	65.5
2025	$4,889,355	$3,703,723	$13,967,927	$17,671,650	33.5	$121,001,901	67.5
2026	$5,112,515	$3,779,468	$15,305,914	$19,085,382	34.9	$115,354,966	69.8
2027	$5,345,307	$3,855,977	$16,756,236	$20,612,213	36.4	$107,886,066	72.5
2028	$5,588,132	$3,933,212	$18,327,978	$22,261,190	38.0	$98,343,226	75.7
2029	$5,841,406	$4,011,131	$20,030,954	$24,042,085	39.7	$86,447,097	79.2
2030	$6,105,564	$4,089,685	$21,875,766	$25,965,451	41.4	$71,887,285	83.2
2031	$6,381,057	$4,168,824	$23,873,864	$28,042,688	43.2	$54,319,565	87.7
2032	$6,668,356	$4,248,494	$26,037,609	$30,286,103	45.1	$33,362,514	92.7
2033	$6,967,948	$4,328,633	$8,593,840	$12,922,473	18.6	$8,593,840	98.2
2034	$7,280,344	$4,409,178	$0	$4,409,178	6.1	$0	100.0
2035	$7,606,071	$4,490,058	$0	$4,490,058	6.0	$0	100.0
2036	$7,945,681	$4,571,199	$0	$4,571,199	5.9	$0	100.0
2037	$8,299,746	$4,652,519	$0	$4,652,519	5.8	$0	100.0
2038	$8,668,862	$4,733,932	$0	$4,733,932	5.7	$0	100.0
2039	$8,972,272	$4,899,619	$0	$4,899,619	5.7	$0	100.0
2040	$9,286,301	$5,071,106	$0	$5,071,106	5.7	$0	100.0
2041	$9,611,322	$5,248,595	$0	$5,248,595	5.7	$0	100.0
2042	$9,947,718	$5,432,295	$0	$5,432,295	5.7	$0	100.0
2043	$10,295,888	$5,622,426	$0	$5,622,426	5.7	$0	100.0
2044	$10,656,245	$5,819,211	$0	$5,819,211	5.7	$0	100.0
2045	$11,029,213	$6,022,883	$0	$6,022,883	5.7	$0	100.0
2046	$11,415,236	$6,233,684	$0	$6,233,684	5.7	$0	100.0
2047	$11,814,769	$6,451,863	$0	$6,451,863	5.7	$0	100.0
2048	$12,228,286	$6,677,678	$0	$6,677,678	5.7	$0	100.0
2049	$12,656,276	$6,911,397	$0	$6,911,397	5.7	$0	100.0
2050	$13,099,245	$7,153,296	$0	$7,153,296	5.7	$0	100.0
2051	$13,557,719	$7,403,661	$0	$7,403,661	5.7	$0	100.0
2052	$14,032,239	$7,662,789	$0	$7,662,789	5.7	$0	100.0

** Beginning of Fiscal Year

EXHIBITS

Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2020

Attained Age	Average Salary <5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
< 20	1	0	0	0	0	0	0	0	0	1
	14,392	0	0	0	0	0	0	0	0	14,392
20-24	28	0	0	0	0	0	0	0	0	28
	28,929	0	0	0	0	0	0	0	0	28,929
25-29	53	3	0	0	0	0	0	0	0	56
	44,792	25,124	0	0	0	0	0	0	0	43,739
30-34	38	29	7	0	0	0	0	0	0	75
	54,259	77,106	63,301	0	0	0	0	0	0	63,429
35-39	27	15	16	9	0	0	0	0	0	67
	47,567	59,324	80,933	94,899	0	0	0	0	0	64,525
40-44	25	10	15	13	2	0	0	0	0	65
	39,708	44,282	81,068	82,573	89,139	0	0	0	0	60,051
45-49	30	13	8	5	21	4	0	0	0	81
	40,480	48,157	65,184	88,731	86,175	94,293	0	0	0	61,634
50-54	27	15	15	17	27	6	6	0	0	113
	31,250	47,136	44,440	62,735	93,952	104,353	95,843	0	0	62,139
55-59	20	16	18	12	14	7	21	8	0	116
	41,944	46,001	52,300	55,073	101,118	73,638	101,377	103,058	0	69,497
60-64	13	12	16	17	14	5	10	13	3	103
	26,048	45,699	36,152	46,384	65,527	44,626	110,715	121,716	83,912	61,511
65-69	4	8	4	4	5	4	4	2	5	40
	26,802	47,905	44,422	32,856	58,342	43,044	69,471	95,802	87,279	53,114
70+	5	2	1	3	4	5	9	1	1	31
	14,065	22,393	45,405	30,626	54,494	44,018	48,690	14,196	66,750	39,020
Total Employees	271	123	100	80	87	31	50	24	9	776
Average Salary	40,408	54,387	58,851	63,880	84,682	68,844	90,544	108,857	83,876	59,282

Exhibit 2 - Retiree Distribution as of January 1, 2020

	Number of Employees			Total Payments		
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	1	0	1	21776.52	0	21,777
40-44	0	0	0	0	0	0
45-49	1	0	1	814	0	814
50-54	4	2	6	135,692	79,837	215,528
55-59	6	7	13	150,565	165,728	316,292
60-64	20	15	35	469,772	701,753	1,171,525
65-69	31	55	86	794,047	3,273,042	4,067,088
70-74	41	46	87	904,258	1,943,404	2,847,662
75-79	48	31	79	1,025,311	1,274,672	2,299,983
80-84	37	26	63	931,357	874,734	1,806,092
85-89	32	24	56	752,461	726,196	1,478,657
90-94	26	16	42	381,664	444,384	826,048
95+	14	4	18	177,018	103,869	280,887
Total	261	226	487	5,744,735	9,587,619	15,332,354
Average (Age/Payment)	77.66	75.08	76.47	22,010	42,423	31,483
Frequency Percent	53.6	46.4	100.0	37.5	62.5	100.0

Exhibit 3 - Disabled Retiree Distribution as of January 1, 2020

	Number of Employees			Total Payments		
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	0	0	0	0	0	0
25-29	0	0	0	0	0	0
30-34	0	0	0	0	0	0
35-39	0	0	0	0	0	0
40-44	1	0	1	69,947	0	69,947
45-49	0	3	3	0	159,146	159,146
50-54	2	2	4	44,771	72,932	117,703
55-59	2	9	11	83,506	412,122	495,628
60-64	5	16	21	152,156	811,569	963,726
65-69	1	20	21	27,761	1,019,127	1,046,888
70-74	2	26	28	72,252	1,300,571	1,372,823
75-79	0	14	14	0	559,921	559,921
80-84	2	8	10	36,735	371,918	408,653
85-89	0	5	5	0	138,068	138,068
90-94	0	2	2	0	73,540	73,540
95-99	0	1	1	0	37,693	37,693
Total	15	106	121	487,127	4,956,609	5,443,737
Average (Age/Payment)	63.72	70.29	69.47	32,475	46,760	44,990
Frequency Percent	12.4	87.6	100.0	8.9	91.1	100.0

EXHIBIT 4 - CASHFLOW FORECAST:

The following is a 30 year forecast of benefit payments net of state reimbursable COLA payments, Contribution Income and Investment Returns.

Plan Year Ending	Benefit Payments	Employee Contributions	Employer Contributions	Investment Returns	Net change in plan assets
2020	$22,647,177	$4,085,550	$12,989,190	$18,267,464	$12,695,027
2021	22,373,648	4,273,888	14,028,325	14,932,350	10,860,915
2022	23,263,744	4,470,404	15,150,592	15,746,820	12,104,072
2023	23,864,360	4,675,442	16,362,639	16,685,868	13,859,589
2024	24,553,458	4,889,355	17,671,650	17,734,539	15,742,086
2025	24,995,481	5,112,515	19,085,382	18,935,242	18,137,658
2026	25,478,553	5,345,307	20,612,213	20,315,796	20,794,763
2027	25,874,594	5,588,132	22,261,190	21,899,748	23,874,475
2028	26,239,363	5,841,406	24,042,085	23,716,731	27,360,859
2029	26,534,122	6,105,564	25,965,451	25,798,347	31,335,241
2030	26,827,866	6,381,057	28,042,688	28,178,313	35,774,192
2031	27,037,800	6,668,356	30,286,103	30,894,119	40,810,778
2032	27,129,390	6,967,948	12,922,473	33,324,128	26,085,159
2033	27,943,272	7,280,344	4,409,178	34,564,672	18,310,922
2034	28,781,570	7,606,071	4,490,058	35,863,903	19,178,462
2035	29,645,017	7,945,681	4,571,199	37,225,276	20,097,139
2036	30,534,367	8,299,746	4,652,519	38,652,482	21,070,380
2037	31,450,399	8,668,862	4,733,932	40,149,457	22,101,853
2038	32,393,910	8,972,272	4,899,619	41,717,505	23,195,486
2039	33,365,728	9,286,301	5,071,106	43,363,807	24,355,486
2040	34,366,700	9,611,322	5,248,595	45,093,144	25,586,361
2041	35,397,701	9,947,718	5,432,295	46,910,624	26,892,936
2042	36,459,632	10,295,888	5,622,426	48,821,698	28,280,381
2043	37,553,421	10,656,245	5,819,211	50,832,199	29,754,235
2044	38,680,023	11,029,213	6,022,883	52,948,356	31,320,429
2045	39,840,424	11,415,236	6,233,684	55,176,826	32,985,322
2046	41,035,637	11,814,769	6,451,863	57,524,728	34,755,723
2047	42,266,706	12,228,286	6,677,678	59,999,674	36,638,932
2048	43,534,707	12,656,276	6,911,397	62,609,801	38,642,767
2049	44,672,565	13,099,245	7,153,296	65,369,806	40,949,782

EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2020, and does not take into account any subsequent changes.

1. Administration

Each of the 104 contributory retirement systems for public employees of the Commonwealth of Massachusetts are guided by the applicable provisions of Chapter 32 of the Massachusetts General Laws and other applicable statutes. Although these boards operate semi-independently, there is a uniform set of rules governing benefits, eligibility, contributions, financing, and accounting.

2. Participation

Participation is mandatory for all full-time employees whose employment commences prior to age 65. Eligibility with respect to part-time, professional, temporary, or intermittent employment is governed by the local board. Membership is optional for certain elected officials, State officials appointed by the Governor, and certain hospital interns.

There are four classes of membership as follows:

(i) Group 1: Most general employees in State and local government

(ii) Group 2: Certain specified hazardous duty positions

(iii) Group 3: State police officers and inspectors

(iv) Group 4: Local police officers, firefighters, and designated employees of the municipal light department.

For members in more than one group, participation will be proportional.

Chapter 176 of the Acts of 2011 created different plan provisions within these groups for those hired on or after April 2, 2012.

3. Salary

Salary is defined as gross regular compensation. Salary does not include bonuses, overtime, severance pay, unused sick leave credit, or other similar compensation.

4. Member Contributions

Member contributions vary depending upon date hired as follows:

Date of Hire	Member Contribution Rate
Prior to 1975	5.0% of Salary
1975 to 1983	7.0% of Salary
1984 to 1996	8.0% of Salary
1996 and Later plus	9.0% of Salary
1979 and Later	2.0% of Salary in excess of $30,000

For Group 1 employees who become members on or after April 2, 2012, the Contribution Rate shall be 6% after the completion of 30 years of service.

5. Average Salary

Average salary is used to determine a participant's benefit. It is defined as the average salary during the three consecutive-year period that produces the highest average. (Alternatively, if a greater amount results, it is the average rate of salary earned during the period or periods, whether or not consecutive, that constitutes the last three years preceding retirement.). For employees who become members on or after April 2, 2012, the averaging period shall be five years.

6. Creditable Service

In general, creditable service is awarded during the period in which a member contributes to the retirement system.

7. **<u>Service Retirement</u>**

a. <u>Eligibility</u>:

For an employee to be eligible for service retirement (also referred to as superannuation), one of the following conditions must be met:

(i) completion of 20 years of service, if hired before April 2, 2012

(ii) for an employee hired prior to January 1, 1978, attainment of age 55 as an active member

(iii) for an employee hired on or after January 1, 1978, attainment of age 55 as an active member and completion of ten years of service

(iv) for a Group 1 employee hired on or after April 2, 2012, attainment of age 60 and completion of ten years of service

b. Benefit Amount:

The retirement allowance is determined as a product of the participant's Benefit Rate times Average Salary times Creditable Service, where Benefit Rate is determined from the following table for those hired prior to April 2, 2012:

Age at	Percentage of Average Salary		
Retirement	Group 1	Group 2	Group 4
65 or Over	.025	.025	.025
64	.024	.025	.025
63	.023	.025	.025
62	.022	.025	.025
61	.021	.025	.025
60	.020	.025	.025
59	.019	.024	.025
58	.018	.023	.025
57	.017	.022	.025
56	.016	.021	.025
55	.015	.020	.025
54	.014	.014	.024
53	.013	.013	.023
52	.012	.012	.022
51	.011	.011	.021
50	.010	.010	.020
49	.009	.009	.019
48	.008	.008	.018
47	.007	.007	.017
46	.006	.006	.016
45	.005	.005	.015
44	.004	.004	.004
43	.003	.003	.003
42	.002	.002	.002
41	.001	.001	.001

For those hired after April 1, 2012 who retire with less than 30 years of service, the following rates are applied:

Age at Retirement	Percentage of Average Salary Group 1	Group 2	Group 4
67 or Over	.0250	.0250	.0250
66	.0235	.0250	.0250
65	.0220	.0250	.0250
64	.0205	.0250	.0250
63	.0190	.0250	.0250
62	.0175	.0250	.0250
61	.0160	.0235	.0250
60	.0145	.0220	.0250
59		.0205	.0250
58		.0190	.0250
57		.0175	.0250
56		.0160	.0235
55		.0145	.0220
54			.0205
53			.0190
52			.0175
51			.0160
50			.0145

For those hired after April 1, 2012 who retire with at least 30 years of service, the following rates are applied:

Age at Retirement	Percentage of Average Salary Group 1	Group 2	Group 4
67 or Over	.02500	.02500	.02500
66	.02375	.02500	.02500
65	.02250	.02500	.02500
64	.02125	.02500	.02500
63	.02000	.02500	.02500
62	.01875	.02500	.02500
61	.01750	.02375	.02500
60	.01625	.02250	.02500
59		.02125	.02500
58		.02000	.02500
57		.01875	.02500
56		.01750	.02375
55		.01625	.02250
54			.02125
53			.02000
52			.01875
51			.01750
50			.01625

8. Deferred Vested Retirement

a. Eligibility:

A participant who has completed ten or more years of creditable service is eligible for a deferred vested retirement benefit. If termination is involuntary, the participant is vested after six years.

b. Benefit Amount:

The participant's accrued benefit is payable commencing at age 55, or may be deferred until later at the employee's option.

c. Refund of Contributions:

In lieu of the deferred pension benefit, a member may elect to receive a refund of their accumulated contributions with interest.

9. Accidental Disability

a. Eligibility:

Participants are eligible for an accidental disability benefit, regardless of service or age, if they become permanently and totally incapacitated for further duty as a result of personal injury sustained while in the performance of duties.

b. Benefit Amount:

The accidental disability amount is 72% of annual salary plus $450 per year for each child plus an additional annuity based upon accumulated Member Contributions with credited interest.

10. Ordinary Disability

a. Eligibility:

An ordinary disability occurs when a member becomes permanently and totally disabled due to sickness or injury that is not job related. In order to be eligible for an ordinary disability benefit, a member must have ten years of service (and be less than age 55 or age 60 if hired on or after April 2, 2012).

b. Benefit Amount:

The ordinary disability amount is equal to the accrued retirement benefit as if the member were age 55 (age 60 if hired on or after April 2, 2012). If the member was a veteran, the benefit is 50% of the member's final rate of Salary during the preceding 12 months, plus an annuity based upon accumulated Member Contributions plus credited interest. If the participant is over age 55 (age 60 if hired on or after April 2, 2012), he will receive not less than the superannuation allowance to which he is entitled.

11. Survivor Benefits

a. Occupational Death:

The survivors of a member who dies due to an occupational injury will be entitled to a lump sum return of contributions plus a pension benefit equal to 72% of the participant's annual Salary.

b. Non-Occupational Death:

Upon the death of a member other than due to an occupational injury, the designated beneficiary will be entitled to a retirement benefit as if Option C had been elected with a minimum of $500 per month to the surviving spouse, plus $120 for the first child, plus $90 for each additional child. If no beneficiary is designated and if the employee worked two years, and is married at least one year, the spouse may elect benefits. If there is no designated beneficiary or surviving spouse, then member contributions are returned. If there are dependent children but no surviving spouse, they may elect minimum survivor benefits of $500 per month plus $120 for the first child and $90 for each additional child.

c. Refund of Contributions:

Upon the death of a member not entitled to survivor benefits, the beneficiary is entitled to a refund of all member contributions with interest.

12. Cost-of-Living Increases

In accordance with the adoption of Chapter 17 of the Acts of 1997, the granting of a cost-of-living adjustment will be determined by an annual vote by the Retirement Board. The amount of increase will be based upon the Consumer Price Index, limited to a maximum of 3.0%, beginning on July 1. All retirees, disabled retirees, and beneficiaries who have been receiving benefits payments for at least one year as of July 1 are eligible for the adjustment. The maximum amount of pension benefit subject to a COLA is $16,000. All COLAs granted to members after 1981 and prior to July 1, 1998 are deemed to be an obligation of the State and are not the liability of the Retirement System.

13. Postretirement Death Benefits

Any benefits following the death of a member after retirement are based upon the form of benefit the participant elected at the time of retirement. There are three available forms as follows:

(i) Option A – Life annuity

(ii) Option B – Life annuity with death benefit equal to excess of member contributions plus credited interest to retirement over annuity benefit paid to member

(iii) Option C – Life annuity with 66-2/3% of benefit continued after death of member to designated joint annuitant

EXHIBIT 6 – ACTUARIAL METHODS AND ASSUMPTIONS:

The actuarial cost method, factors, and assumptions used in determining cost estimates are presented below.

1. Member Data

The member data used in the determination of cost estimates consist of pertinent information with respect to the active, inactive, retired, and disabled members of the employer as supplied by the employer to the actuary.

2. Valuation Date

January 1, 2020.

3. Actuarial Cost Method

The costs of the Plan have been determined in accordance with the individual entry age normal actuarial cost method.

4. Rate of Investment Return

It is assumed that the assets of the fund will accumulate at a compound annual rate of 7.25% per annum. The previous valuation assumed 7.5%.

5. Salary Scale

It is assumed that salaries including longevity will increase at a rate of 3.5% per year.

6. Cost-of-Living Increases

Cost-of-living increases have been assumed to be 3.0% of the lesser of the pension amount and $16,000 per year.

7. Value of Investments

Assets held by the fund are valued at market value as reported by the Public Employees' Retirement Administration Commission (PERAC). The actuarial value of assets is determined using a five-year smoothing of asset returns greater than or less than the assumed rate of return.

8. Annual Rate of Withdrawal Prior to Retirement

Based on an analysis of experience, the assumed annual rates of withdrawal may best be illustrated by the following rates at the following ages:

Service	General Employees	Police and Fire Employees
0	0.2080	0.1500
5	0.1020	0.1000
10	0.0650	0.0600
15	0.0417	0.0600
20	0.0400	0.0000
30	0.0000	0.0000

9. Annual Rate of Mortality

It is assumed that mortality for is represented by the various SOA Pub-2010 Public Retirement Plans Mortality Tables specific to the Group, Pre-retirement versus Post, Disabled and Beneficiaries, with Scale MP-2019 improvements until 2025.

10. Service Retirement

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired prior to April 2, 2012:

Age	Male General Employees	Female General Employees	Male and Female Police and Fire Employees
50	0.0360	0.1019	0.0382
51	0.0405	0.0714	0.0351
52	0.0437	0.0562	0.0436
53	0.0366	0.0448	0.0527
54	0.0451	0.0488	0.0999
55	0.0477	0.0469	0.1110
56	0.0574	0.0518	0.1413
57	0.0632	0.0509	0.1292
58	0.0765	0.0552	0.1499
59	0.0917	0.0645	0.1679
60	0.1057	0.0774	0.1871
61	0.1224	0.1038	0.2073
62	0.1473	0.1168	0.2176
63	0.1777	0.1440	0.3338
64	0.2136	0.1708	0.5664
65	0.2615	0.1939	1.00000
66	0.2682	0.1959	1.00000
67	0.2500	0.2000	1.00000
68	0.2500	0.2000	1.00000
69	0.2500	0.2000	1.00000
70 to 76	0.2500	0.2500	1.00000
77 to 79	0.3500	0.2500	1.00000
80	1.0000	1.0000	1.00000

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages for those hired on or after April 2, 2012:

Age	Male General Employees	Female General Employees	Male and Female Police and Fire Employees
50	0.0000	0.0000	0.0191
51	0.0000	0.0000	0.0176
52	0.0000	0.0000	0.0436
53	0.0000	0.0000	0.0211
54	0.0000	0.0000	0.0266
55	0.0000	0.0000	0.0370
56	0.0000	0.0000	0.1060
57	0.0000	0.0000	0.1938
58	0.0000	0.0000	0.1499
59	0.0000	0.0000	0.1119
60	0.0477	0.0469	0.0936
61	0.0574	0.0518	0.1555
62	0.0632	0.0509	0.1741
63	0.0765	0.0552	0.2670
64	0.0917	0.0645	0.4720
65	0.1057	0.0774	0.2500
66	0.1224	0.1038	0.3000
67	0.1473	0.1168	1.0000
68	0.1777	0.1440	1.0000
69	0.2136	0.1708	1.0000
70	0.2615	0.1939	1.0000
70 to 76	0.2682	0.1959	1.0000
77 to 79	0.2500	0.2000	1.0000
80	0.2500	0.2000	1.0000

12. Annual Rate of Disability Prior to Retirement

Based on an analysis of experience, the assumed annual rates of disability may best be illustrated by the following probabilities at the following ages:

Attained Age	General Employees	Police and Fire Employees
20	0.000100	0.000500
30	0.000152	0.000967
40	0.000663	0.002500
50	0.001271	0.007634

In addition, it is assumed for the general employees that 20% of all disabilities are ordinary (80% are service connected). For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected).

13. Family Composition

It is assumed that 80% of all members will be survived by a spouse and that females (males) are three years younger (older) than members.

14. Administrative Expenses

The normal cost is increased by an amount equal to the anticipated administrative expenses for the upcoming fiscal year. The amount for fiscal year 2020 is $425,000 and is anticipated to increase at 3.5% per year.

EXHIBIT 7 – GLOSSARY OF TERMS:

This glossary summarizes the technical terms contained in this report.

1. <u>Actuarial Accrued Liability</u>

That portion of the Actuarial Present Value of plan benefits that is not provided for by future employer Normal Costs or employee contributions.

2. <u>Actuarial Assumptions</u>

Assumptions as to the occurrence of future events affecting the Retirement System such as:

- Rates of investment returns
- Increases in a member's salary
- Inflation
- The probability of mortality, turnover, disablement
- Retirement at each age and other relevant items

3. <u>Actuarial Cost Method</u>

A procedure for allocating the Actuarial Present Value of pension plan benefits between Normal Cost and Actuarial Accrued Liability.

4. <u>Actuarial Present Value</u>

The single sum amount required at the valuation date that is required to provide for anticipated future events based upon the terms of the plan and the Actuarial Assumptions.

5. <u>Forecast</u>

A projection of future benefit payments or contribution requirements based upon the terms of the plan, the current asset amounts, the Actuarial Assumptions, and additional assumptions as to the replacement of terminating employees with new employees.

6. Normal Cost

That portion of the Actuarial Present Value of future benefits that is assigned to the current year.

7. Unfunded Actuarial Accrued Liability

That portion of the Actuarial Accrued Liability that is not provided for by current actuarial value of assets.

8. Valuation Method

The method used to divide the cost of future benefits among the Actuarial Accrued Liability, the current year's Normal Costs, and future years' Normal Costs. The resulting current funding requirement is then determined as the current year's Normal Cost plus the payment necessary to amortize the Unfunded Actuarial Liability.

9. Vested Liability

That portion of the Actuarial Present Value of Accrued Benefits that a member would be entitled to if the member terminated employment with the employer as of the valuation date.

CERTIFICATION:

This report fairly represents the actuarial position of the Medford Retirement System contributing as of January 1, 2020, in accordance with generally accepted actuarial principles applied consistently with the preceding valuation. In our opinion, the actuarial assumptions used to compute actuarial accrued liability and normal cost are reasonably related to plan experience and to reasonable expectations, and represents our best estimate of anticipated plan experience.

The funded status measure is appropriate for assessing the sufficiency of plan assets to cover the estimated cost of settling the plan's benefit obligations. The funded status measure is appropriate for assessing the need for or the amount of future contributions. The funded status measure would be different if the measure reflected the market value of assets rather than the actuarial value of assets.

Future actuarial measurements may differ significantly from the current measurements presented in this report due to such factors as the following: plan experience differing from that anticipated by the economic or demographic assumptions; changes in economic or demographic assumptions; increases or decreases expected as part of the natural operation of the methodology used for these measurements (such as the end of an amortization period or additional cost or contribution requirements based on the plan's funded status); and changes in plan provisions or applicable law. Due to the limited scope of our assignment, we did not perform an analysis of the potential range of such future measurements.

The report was prepared under the supervision of Daniel Sherman, an Associate of the Society of Actuaries and a Member of the American Academy of Actuaries, who takes responsibility for the overall appropriateness of the analysis, assumptions and results. Daniel Sherman is deemed to meet the General Qualification Standard and the basic education and experience requirement in the pension area. Based on over thirty years of performing valuations of similar complexity, Mr. Sherman is qualified by experience. Daniel Sherman has met the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sherman Actuarial Services, LLC

Daniel W. Sherman, ASA, MAAA

September, 2020

BREAKOUTS

Breakouts

	Total	All Others	Housing	Water and Sewer
(1) Participants				
(a) Actives	776	745	21	10
(b) Inactives	203	198	3	2
(c) Retirees	428	386	27	15
(d) Disabled Retirees	120	106	7	7
(e) Total	1,586	1,435	58	34
(2) Payroll of Active Participants	$46,003,072	$43,937,853	$1,356,331	$708,888
(3) Percentage of Payroll	100.00%	95.51%	2.95%	1.54%
(4) Accrued Liability	$334,961,570	$329,752,736	$3,132,105	$2,076,729
(5) Assets	$205,456,666	$202,261,704	$1,921,151	$1,273,811
(6) Unfunded Accrued Liability	$129,504,904	$127,491,032	$1,210,954	$802,918
(7) Employee Normal Cost	$4,085,550	$3,898,924	$123,231	$63,395
(8) Employer Normal Cost	$2,866,822	$2,677,003	$120,233	$69,586
(9) Administrative Expenses*	$425,000	$418,391	$3,974	$2,635
(10) Appropriation				
(a) ERI & Pension Holiday	504,521	496,632	7,889	0
(b) Remaining Amortizations	12,631,612	12,180,874	372,424	78,315
(c) Employer Normal Cost	2,866,822	2,712,712	84,524	69,586
(d) Administrative Expenses*	425,000	409,835	12,530	2,635
(e) Total	16,427,956	15,800,053	477,367	150,536
(11) Fiscal 2021 Cost	$12,989,190	12,492,722	377,443	119,025
(12) Fiscal 2022 Cost	$14,028,325	13,492,140	407,638	128,547
(13) Percentage of Total Cost	100.00%	96.18%	2.91%	0.92%

* Allocation is based on the ratio of Accrued Liability to Total Accrued Liability.