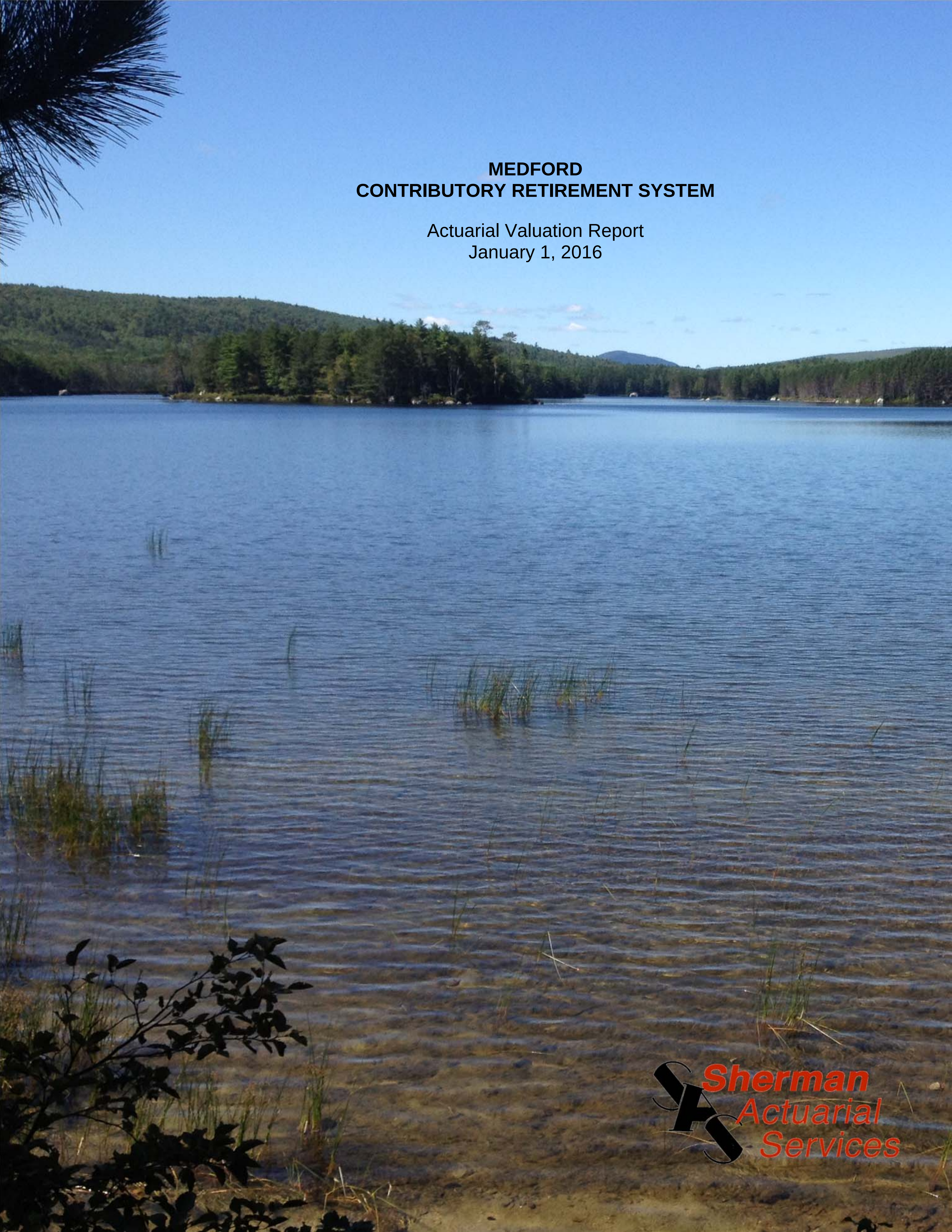
MEDFORD
CONTRIBUTORY RETIREMENT SYSTEM

Actuarial Valuation Report
January 1, 2016



Sherman Actuarial Services

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Report Summary:

Highlights	**January 1, 2014**	**January 1, 2016**
Contributions		
Funding Schedule FY 2017	$11,000,000	$11,000,000
Funding Schedule FY 2018	11,500,000	11,174,776
Funded Ratios		
GAS No. 25	61.0%	67.3%
Participants		
Actives	698	729
Retirees and Beneficiaries	466	468
Inactives	99	129
Disabled	111	115
Total	1,374	1,441
Payroll		
Payroll of Active Members	$37,863,532	$39,326,319
Average Payroll	54,246	53,946
Normal Cost		
Employer	$2,832,477	$2,538,941
Employee	3,144,144	3,370,096
Administrative Expenses	325,000	325,000
Total	$6,301,621	$6,234,037
Actuarial Accrued Liabilities		
Actives	$130,534,678	$120,803,090
Retirees, Beneficiaries, Disabilities and Inactives	137,992,970	145,944,073
Total	$268,527,648	$266,747,163
Actuarial Value of Assets	$163,680,899	$179,451,376
Unfunded Actuarial Accrued Liabilities	$104,846,749	$87,295,787

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2016, 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, 2016.
- 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, 2016.

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 2014 actuarial assumptions and plan provisions, the total unfunded actuarial accrued liability decreased by 7.2% to $101,038,200. The decrease is the result of contributions to the trust and net favorable actuarial experience during the preceding years. The sources of actuarial (gains) and losses are as follows:

Assets	(254,254)
Retirements	(5,993,389)
Terminations	(40,305)
Death while active	318,283
Disabled while active	1,482,643
Salary	(6,155,508)
New Participants	517,120
Inactive Mortality and data	5,201,672
Other	(288,582)
Total (Gain) / Loss	(5,212,320)

The 2015 Experience Study of several Massachusetts Public Sector plans required changes in the actuarial assumptions. These changes reduced the unfunded actuarial accrued liability by $13,742,413, and the employer Normal Cost by $561,362.

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, 2014	January 1, 2016
Superannuation	$4,139,138	$4,024,080
Termination	287,550	771,673
Death	237,582	281,010
Disability	1,312,351	832,274
Administrative Expenses	$325,000	$325,000
Total Normal Cost	$6,301,621	$6,234,037
% of Pay	16.6%	15.9%
Employee Contributions	$3,144,144	$3,370,096
% of Pay	8.3%	8.6%
Employer Normal Cost	$3,157,477	$2,863,941
% of Pay	8.3%	7.3%

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, 2014	January 1, 2016
Actives		
Superannuations	$121,292,297	$116,488,817
Termination	906,994	(2,383,225)
Death	2,905,316	3,115,858
Disability	5,430,071	3,581,640
Retirees and Inactives		
Retirees and Beneficiaries	$95,508,883	$99,989,250
Terminated (Refund)	1,236,647	1,151,198
Disabled	41,247,440	44,803,625
Total	$268,527,648	$266,747,163

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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, 2014	January 1, 2016
Actives		
Superannuation	$149,800,956	$144,440,496
Termination	2,098,135	3,180,227
Death	4,569,490	5,018,996
Disability	15,842,379	10,187,755
Retirees and Inactives		
Retirees and Beneficiaries	$95,508,883	$99,989,250
Terminated (Refund)	1,236,647	1,151,198
Disabled	41,247,440	44,803,625
Total	$310,303,930	$308,771,547

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, 2014	January 1, 2016
Cash equivalents	$2,861,479	$10,346,267
Short term investments	0	0
Fixed income securities	49,427,981	32,182,525
Equities	26,645,173	25,190,832
International	58,618,251	61,196,806
Real Estate	9,175,149	10,288,373
Venture Capital	0	0
Other	22,652,827	34,958,554
Accounts receivable	363,218	424,847
Accounts payable	(1,896,468)	(4,275,511)
Accrued income	107,086	97,308
Total Market Value	$167,954,696	$170,410,001
Total Actuarial Value	$163,680,899	$179,451,376

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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, 2016 is presented in Table V.

Table V

		January 1, 2016
(1)	Market value at January 1, 2015	$173,685,432
(2)	2015 Contributions	$14,525,357
(3)	2015 Payments	($18,325,139)
(4)	Net interest adjustment at 7.5% on (1), (2), and (3) to December 31, 2015	$12,883,916
(5)	Expected market value on January 1, 2016 (1) + (2) + (3) + (4)	$182,769,566
(6)	Actual market value on January 1, 2016	$170,410,001
(7)	2015 (Gain) / Loss	$12,359,565
(8)	80% of 2015 (Gain) / Loss	$9,887,652
(9)	2014 (Gain) / Loss	$3,675,077
(10)	60% of 2014 (Gain) / Loss	$2,205,046
(11)	2013 (Gain) / Loss	($4,672,598)
(12)	40% of 2013 (Gain) / Loss	($1,869,039)
(13)	2012 (Gain) / Loss	($5,911,419)
(14)	20% of 2012 (Gain) / Loss	($1,182,284)
(15)	Actuarial value on January 1, 2016, (6) + (8) + (10) + (12) + (14)	$179,451,376
	but not less than 85% nor greater than 115% of (6)	$179,451,376
(16)	Ratio of actuarial value to market value	105.31%
(17)	Actuarial Value Return for 2014	8.01%
(18)	Actuarial Value Return for 2015	5.63%
(19)	Market Value Return for 2014	5.29%
(20)	Market Value Return for 2015	0.31%

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, 2014	January 1, 2016
Actuarial Accrued Liability	$268,527,648	$266,747,163
Actuarial Assets	163,680,899	179,451,376
Unfunded Actuarial Accrued Liability	$104,846,749	$87,295,787
Funded Status	61.0%	67.3%

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, 2031
  $ 84,127,243 over 15 years with 4.0% increasing payments
- Level amortization of the 2002 Early Retirement Incentive by June 30, 2026
  $ 58,523 over 10 years
- Increasing amortization of the Funding Holiday by June 30, 2023
  $ 2,688,314 over 7 years with 4.5% increasing payments
- Level amortization of the 2010 Early Retirement Incentive by June 30, 2022
  $ 421,708 over 6 years
- Interest adjustment for payments deposited on August 1st.

The pension appropriation is shown in Table VII.

Table VII

	January 1, 2014	January 1, 2016
Normal cost	$3,157,477	$2,863,941
Amortization payment of the unfunded accrued liability	6,368,737	6,999,056
Amortization payment of 2002 ERI liability	7,931	7,931
Amortization payment of 2010 ERI liability	83,575	83,575
Amortization payment of Funding Holiday and ERI	382,235	417,410
Total cost	$9,999,955	$10,371,912
% of Pay	26.4%	26.4%
Fiscal 2017 cost	$11,000,000	$11,000,000
Fiscal 2018 cost	$11,500,000	$11,174,776

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 4.5% per year. The employee contribution rate is expected to increase to 10.5% by 2036 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 14 years until the unfunded liabilities are substantially paid off, at which time only the normal cost will remain. The total cost represents about 27.5% of payroll, decreasing to 26% by the time the unfunded liabilities are fully paid off, leaving only a normal cost of about 6% thereafter. The decrease in the cost as a percentage of payroll is a result of the increase in member deductions.

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Appropriation Forecast

Fiscal Year Ending	Payroll*	Employee Contribution	Employer Normal Cost with Interest	Amortization Payments with Interest	Employer Total Cost with Interest	Employer Total Cost % of Payroll	Funded Ratio %**
2017	$39,326,319	$3,370,096	$2,987,347	$8,012,653	$11,000,000	28.0	67.3
2018	$40,702,740	$3,529,404	$3,048,768	$8,126,008	$11,174,776	27.5	68.6
2019	$42,127,336	$3,695,735	$3,110,828	$8,449,505	$11,560,333	27.4	70.0
2020	$43,601,793	$3,869,386	$3,173,498	$8,786,044	$11,959,542	27.4	71.5
2021	$45,127,856	$4,050,665	$3,236,744	$9,136,152	$12,372,896	27.4	73.1
2022	$46,707,331	$4,239,894	$3,300,530	$9,500,377	$12,800,907	27.4	74.8
2023	$48,342,087	$4,437,407	$3,364,816	$9,792,111	$13,156,927	27.2	76.6
2024	$50,034,060	$4,643,551	$3,429,558	$9,593,786	$13,023,344	26.0	78.6
2025	$51,785,252	$4,858,690	$3,494,711	$9,977,206	$13,471,917	26.0	80.6
2026	$53,597,736	$5,083,201	$3,560,223	$10,375,964	$13,936,187	26.0	82.8
2027	$55,473,657	$5,317,475	$3,626,040	$10,782,398	$14,408,438	26.0	85.2
2028	$57,415,235	$5,561,921	$3,692,103	$11,213,694	$14,905,797	26.0	87.7
2029	$59,424,768	$5,816,965	$3,758,349	$11,662,242	$15,420,591	25.9	90.5
2030	$61,504,635	$6,083,048	$3,824,709	$12,128,732	$15,953,441	25.9	93.5
2031	$63,657,297	$6,360,632	$3,891,110	$12,613,881	$16,504,991	25.9	96.6
2032	$65,885,303	$6,650,195	$3,957,474	$0	$3,957,474	6.0	100.0
2033	$68,191,288	$6,952,235	$4,023,716	$0	$4,023,716	5.9	100.0
2034	$70,577,983	$7,267,271	$4,089,748	$0	$4,089,748	5.8	100.0
2035	$73,048,213	$7,595,844	$4,155,473	$0	$4,155,473	5.7	100.0
2036	$75,604,900	$7,938,515	$4,220,789	$0	$4,220,789	5.6	100.0
2037	$78,251,072	$8,216,363	$4,368,516	$0	$4,368,516	5.6	100.0
2038	$80,989,859	$8,503,935	$4,521,414	$0	$4,521,414	5.6	100.0
2039	$83,824,504	$8,801,573	$4,679,664	$0	$4,679,664	5.6	100.0
2040	$86,758,362	$9,109,628	$4,843,452	$0	$4,843,452	5.6	100.0
2041	$89,794,904	$9,428,465	$5,012,973	$0	$5,012,973	5.6	100.0
2042	$92,937,726	$9,758,461	$5,188,427	$0	$5,188,427	5.6	100.0
2043	$96,190,547	$10,100,007	$5,370,022	$0	$5,370,022	5.6	100.0
2044	$99,557,216	$10,453,508	$5,557,973	$0	$5,557,973	5.6	100.0
2045	$103,041,718	$10,819,380	$5,752,502	$0	$5,752,502	5.6	100.0
2046	$106,648,178	$11,198,059	$5,953,839	$0	$5,953,839	5.6	100.0
2047	$110,380,865	$11,589,991	$6,162,224	$0	$6,162,224	5.6	100.0
2048	$114,244,195	$11,995,640	$6,377,902	$0	$6,377,902	5.6	100.0

* Calendar basis ** Beginning of Fiscal Year

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GASB Statements No. 25, No. 27, No. 67 and No. 68

Effective for periods beginning after June 15, 1997, the Governmental Accounting Standards Board (GASB) requires the disclosure of pension related liabilities for public employer financial statements in accordance with Statements 25 and 27. These statements, which replace GASB Statement No. 5, must be adhered to by any public employee retirement system that follows Generally Accepted Accounting Principles (GAAP).

These disclosures are intended to establish a reporting framework that distinguishes between:

- current financial information about plan assets and financial activities,
- actuarially determined information from a long-term perspective,
- the funded status of the plan, and
- progress being made in accumulating sufficient assets to pay benefits when due.

Footnote disclosures required by GASB Statement No. 25 and 27 include a description of the plan, a summary of significant accounting policies, and information about contributions, legally required reserves, and investment concentrations. As a result of the oversight of the Public Employees Retirement Administration Commission (PERAC) and the conversion of unpaid contributions to pension related debt, the Net Pension Obligation (NPO) as required by Statement No. 27 will effectively always be equal to $0. The required disclosure information is shown in Table VIII.

Table VIII

		January 1, 2014	January 1, 2016
(1)	Actuarial Accrued Liability	$268,527,648	$266,747,163
(2)	Actuarial Value of Assets	163,680,899	179,451,376
(3)	Unfunded Actuarial Accrued Liability	$104,846,749	$87,295,787
(4)	Funded Ratio (2)/(1)	61.0%	67.3%
(5)	Covered Payroll	$37,863,532	$39,326,319
(6)	UAAL as a percentage of payroll: (3)/(5)	276.9%	222.0%
(7)	Annual Required Contribution (ARC)	$9,400,000	$11,000,000
(8)	Net Pension Obligation	$0	$0

EXHIBITS

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Exhibit 1 - Age/Service Distribution with Salary as of January 1, 2016

Attained Age	Average Salary <5	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
< 20	0	0	0	0	0	0	0	0	0	0
	0	0	0	0	0	0	0	0	0	0
20-24	16	0	0	0	0	0	0	0	0	16
	15,836	0	0	0	0	0	0	0	0	15,836
25-29	47	1	0	0	0	0	0	0	0	48
	39,690	71,314	0	0	0	0	0	0	0	40,349
30-34	34	14	6	0	0	0	0	0	0	54
	41,185	59,088	66,165	0	0	0	0	0	0	48,602
35-39	21	14	13	5	0	0	0	0	0	53
	40,712	61,567	68,880	61,569	0	0	0	0	0	55,098
40-44	20	6	9	16	2	0	0	0	0	53
	35,636	60,680	65,981	69,772	105,502	0	0	0	0	56,566
45-49	22	10	12	28	11	6	1	0	0	90
	36,622	32,468	58,017	75,885	78,585	77,939	0	0	0	59,544
50-54	29	18	19	8	10	22	8	0	0	114
	36,405	40,299	43,019	67,643	60,373	86,121	94,916	0	0	56,117
55-59	17	17	16	25	9	16	21	4	1	126
	31,920	33,827	46,954	52,626	57,029	77,611	94,754	62,053	53,804	57,393
60-64	8	13	10	13	10	10	22	20	4	110
	25,430	40,709	41,596	46,761	47,758	66,150	82,690	85,283	91,363	61,690
65-69	2	6	2	8	8	6	1	0	1	34
	24,755	32,105	45,335	48,271	41,624	47,986	119,109	0	61,634	44,724
70+	2	0	2	6	4	8	2	3	4	31
	31,865	0	15,401	27,804	21,055	35,932	11,152	0	26,716	41,907
Total Employees	218	99	89	109	54	68	55	27	10	729
Average Salary	35,815	45,167	52,680	60,244	57,171	71,190	85,632	72,366	58,775	53,624

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Exhibit 2 - Retiree Distribution as of January 1, 2016

	Number of Employees			Total Payments		
Attained Age	Female	Male	Total	Female	Male	Total
< 20	0	0	0	0	0	0
20-24	1	0	1	15,084	0	15,084
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	0	0	0	0	0	0
45-49	0	3	3	0	79,240	79,240
50-54	1	1	2	37,481	12,744	50,224
55-59	4	6	10	78,096	261,741	339,837
60-64	13	13	26	236,241	680,152	916,393
65-69	40	50	90	790,059	2,143,856	2,933,916
70-74	40	33	73	704,527	1,396,659	2,101,186
75-79	36	28	64	819,673	935,917	1,755,591
80-84	37	27	64	734,118	899,294	1,633,413
85-89	49	33	82	707,668	948,212	1,655,880
90-94	24	14	38	301,679	297,018	598,697
95+	12	3	15	122,196	57,916	180,112
Total	257	211	468	4,546,822	7,712,750	12,259,572
Average (Age/Payment)	78.75	75.68	77.37	17,692	36,553	26,196
Frequency Percent	54.9	45.1	100.0	37.1	62.9	100.0

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Exhibit 3 - Disabled Retiree Distribution as of January 1, 2016

	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	0	1	1	0	46,991	46,991
45-49	0	2	2	0	87,682	87,682
50-54	1	4	5	21,401	181,149	202,551
55-59	3	11	14	100,038	465,559	565,597
60-64	0	12	12	0	517,410	517,410
65-69	2	31	33	75,344	1,419,198	1,494,542
70-74	1	16	17	18,909	620,186	639,095
75-79	2	15	17	43,470	621,045	664,515
80-84	0	7	7	0	190,100	190,100
85-89	0	5	5	0	171,051	171,051
90-94	0	3	3	0	84,224	84,224
95-99	0	0	0	0	0	0
Total	9	107	116	259,162	4,404,596	4,663,758
Average (Age/Payment)	73.8	67.0	68.1	28,796	41,164	40,205
Frequency Percent	7.8	92.2	100.0	5.6	94.4	100.0

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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
2016	$20,026,117	$3,370,096	$11,000,000	$12,788,226	$7,132,204
2017	19,919,146	3,529,404	11,174,776	13,518,096	8,303,129
2018	20,969,245	3,695,735	11,560,333	14,113,747	8,400,570
2019	21,863,725	3,869,386	11,959,542	14,722,959	8,688,163
2020	22,661,253	4,050,665	12,372,896	15,357,856	9,120,165
2021	23,227,913	4,239,894	12,800,907	16,034,222	9,847,110
2022	23,847,203	4,437,407	13,156,927	16,761,098	10,508,229
2023	24,269,656	4,643,551	13,023,344	17,529,966	10,927,205
2024	24,690,884	4,858,690	13,471,917	18,348,258	11,987,981
2025	25,038,113	5,083,201	13,936,187	19,249,470	13,230,745
2026	25,334,159	5,317,475	14,408,438	20,246,186	14,637,940
2027	25,575,169	5,561,921	14,905,797	21,351,413	16,243,963
2028	25,805,135	5,816,965	15,420,591	22,578,221	18,010,643
2029	26,037,168	6,083,048	15,953,441	23,938,208	19,937,529
2030	26,271,288	6,360,632	16,504,991	25,443,421	22,037,756
2031	26,507,513	6,650,195	3,957,474	26,706,886	10,807,042
2032	26,745,862	6,952,235	4,023,716	27,512,832	11,742,920
2033	26,986,355	7,267,271	4,089,748	28,389,139	12,759,804
2034	27,229,009	7,595,844	4,155,473	29,341,898	13,864,205
2035	27,473,846	7,938,515	4,220,789	30,377,682	15,063,140
2036	27,720,884	8,216,363	4,368,516	31,500,171	16,364,166
2037	27,970,144	8,503,935	4,521,414	32,720,220	17,775,425
2038	28,221,644	8,801,573	4,679,664	34,046,096	19,305,689
2039	28,475,407	9,109,628	4,843,452	35,486,730	20,964,403
2040	28,731,451	9,428,465	5,012,973	37,051,754	22,761,741
2041	28,989,797	9,758,461	5,188,427	38,751,568	24,708,659
2042	29,250,466	10,100,007	5,370,022	40,597,392	26,816,955
2043	29,513,479	10,453,508	5,557,973	42,601,332	29,099,334
2044	29,778,857	10,819,380	5,752,502	44,776,445	31,569,470
2045	30,557,181	11,198,059	5,953,839	47,118,017	33,712,734

EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:

This summary is prepared in accordance with Chapter 32 as of January 1, 2016, 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. Service Retirement

a. Eligibility:

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, 2016.

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 7.5% per annum.

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 both pre-retirement mortality and beneficiary mortality is represented by the RP-2014 Blue Collar Mortality with Scale MP-2014, fully generational. Mortality for retired members for Group 1 and 2 is represented by the RP-2014 Blue Collar Mortality Table set forward five years for males and 3 years for females, fully generational. Mortality for retired members for Group 4 is represented by the RP-2014 Blue Collar Mortality Table set forward three years for males, and six years for females, fully generational. Mortality for disabled members for Group 1 and 2 is represented by the RP-2000 Mortality Table set forward six years. Mortality for disabled members for Group 4 is represented by the RP-2000 Mortality Table set forward two years. Generational adjusting is based on Scale MP-2014.

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 2016 is $325,000 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:

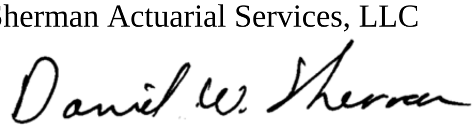
This report fairly represents the actuarial position of the Medford Retirement System contributing as of January 1, 2016, in accordance with generally accepted actuarial principles applied consistently with the preceding valuation. In our opinion, the actuarial assumptions used to compute actuarial accrued 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, 2016

BREAKOUTS

P:\Medford\Val16\[Medford16_Val New Asumptions.xlsm]Breakouts

Breakouts

	Total	All Others	Housing	Water and Sewer
(1) Participants				
(a) Actives	729	679	40	10
(b) Inactives	129	126	1	2
(c) Retirees	403	362	20	21
(d) Disabled Retirees	115	103	7	5
(e) Total	1,441	1,270	68	38
(2) Payroll of Active Participants	$39,326,319	$36,463,651	$2,326,839	$535,829
(3) Percentage of Payroll	100.00%	92.72%	5.92%	1.36%
(4) Accrued Liability	$266,747,163	$262,064,100	$3,399,558	$1,283,505
(5) Assets	$179,451,376	$176,300,894	$2,287,017	$863,465
(6) Unfunded Accrued Liability	$87,295,787	$85,763,206	$1,112,541	$420,040
(7) Employee Normal Cost	$3,370,096	$3,115,484	$207,887	$46,725
(8) Employer Normal Cost	$2,538,941	$2,236,963	$250,547	$51,431
(9) Administrative Expenses*	$325,000	$319,294	$4,142	$1,564
(10) Appropriation				
(a) ERI & Pension Holiday	425,341	417,410	7,931	0
(b) Remaining Amortizations	7,082,630	6,629,490	419,061	34,079
(c) Employer Normal Cost	2,538,941	2,337,287	150,223	51,431
(d) Administrative Expenses*	325,000	304,207	19,229	1,564
(e) Total	10,371,912	9,688,394	596,445	87,074
(11) Fiscal 2017 Cost	$11,000,000	10,275,090	632,563	92,347
(12) Fiscal 2018 Cost	$11,174,776	10,438,347	642,614	93,814
(13) Percentage of Total Cost	100.00%	93.41%	5.75%	0.84%

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