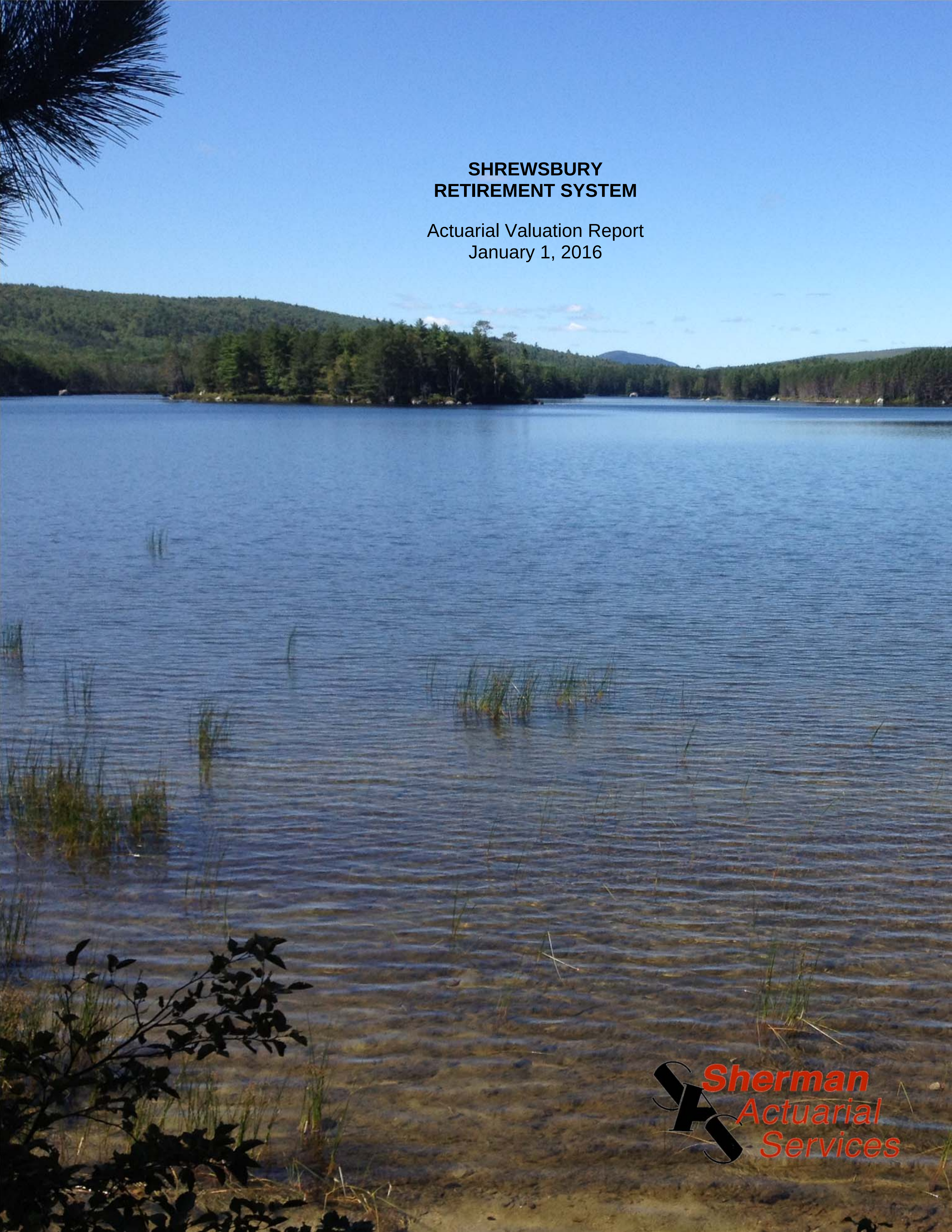
SHREWSBURY
RETIREMENT SYSTEM

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	$6,127,778	$6,127,778
Funding Schedule FY 2018	6,378,506	6,252,284
Funded Ratios		
GAS No. 25	72.1%	83.9%
Participants		
Actives	572	511
Retirees and Beneficiaries	219	235
Inactives	121	125
Disabled	30	32
Total	942	903
Payroll		
Payroll of Active Members	$23,896,051	$23,692,881
Average Payroll	41,776	46,366
Normal Cost		
Employer	735,948	468,488
Employee	2,047,005	2,047,500
Administrative Expenses	120,000	100,000
Total	2,902,953	2,615,988
Actuarial Accrued Liabilities		
Actives	54,533,627	53,692,767
Retirees, Beneficiaries, Disabilities and Inactives	59,986,183	65,354,246
Total	114,519,810	119,047,013
Actuarial Value of Assets	82,514,065	99,832,849
Unfunded Actuarial Accrued Liabilities	$32,005,745	$19,214,164

Introduction

This report presents the findings of an actuarial valuation as of January 1, 2016, of Shrewsbury 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 Shrewsbury 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 year, based on the 2014 actuarial assumptions and plan provisions, the total unfunded actuarial accrued liability decreased by 20.7% to $20,124,720. The decrease is the result of net favorable actuarial experience during the preceding years and an aggressive funding schedule. The sources of actuarial (gains) and losses are as follows:

Assets	(4,395,779)
Retirements	(2,393,673)
Terminations	192,306
Death while active	(86,685)
Disabled while active	(121,919)
Salary	(1,777,380)
New Participants	210,534
Inactive Mortality and data	1,441,827
Other	(139,936)
Total (Gain) / Loss	(7,070,705)

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 $6,809,723, and the employer Normal Cost by $448,604. In addition, the Board reduced the assumed investment return from 8% to 7.5%. This change increased the unfunded actuarial accrued liability by $5,899,167, and the employer Normal Cost by $186,603.

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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	$1,905,526	$1,396,717
Termination	337,559	813,868
Death	136,308	106,312
Disability	403,560	199,091
Administrative Expenses	120,000	100,000
Total Normal Cost	2,902,953	2,615,988
% of Pay	12.1%	11.0%
Employee Contributions	2,047,005	2,047,500
% of Pay	8.6%	8.6%
Employer Normal Cost	$855,948	$568,488
% of Pay	3.6%	2.4%

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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	$48,866,518	$51,814,488
Termination	1,200,106	(1,691,772)
Death	1,585,497	1,437,567
Disability	2,881,506	2,132,484
Retirees and Inactives		
Retirees and Beneficiaries	50,310,217	54,745,881
Terminated (Refund)	1,022,853	1,224,040
Disabled	8,653,113	9,384,325
Total	$114,519,810	$119,047,013

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	$63,982,685	$61,667,209
Termination	2,592,740	4,477,605
Death	2,614,395	2,157,535
Disability	6,491,362	3,578,770
Retirees and Inactives		
Retirees and Beneficiaries	50,310,217	54,745,881
Terminated (Refund)	1,022,853	1,224,040
Disabled	8,653,113	9,384,325
Total	$135,667,365	$137,235,365

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	$1,242,397	$939,588
Short term investments	0	0
Fixed income securities	9,480,107	10,689,939
Equities	27,908,376	31,176,376
International	4,442,588	4,321,482
Real Estate	2,083,795	2,643,029
Venture Capital	0	0
Other	43,504,233	48,352,700
Accounts receivable	40,304	39,415
Accounts payable	0	0
Accrued income	3	3
Total Market Value	$88,701,803	$98,162,532
Total Actuarial Value	$82,514,065	$99,832,849

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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 (8%) 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 10%. 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	$97,221,791
(2)	2015 Contributions	$8,370,801
(3)	2015 Payments	($7,893,836)
(4)	Net interest adjustment at 8% on (1), (2), and (3) to December 31, 2015	$7,796,822
(5)	Expected market value on January 1, 2016 (1) + (2) + (3) + (4)	$105,495,578
(6)	Actual market value on January 1, 2016	$98,162,532
(7)	2015 (Gain) / Loss	$7,333,046
(8)	80% of 2015 (Gain) / Loss	$5,866,437
(9)	2014 (Gain) / Loss	($951,011)
(10)	60% of 2014 (Gain) / Loss	($570,607)
(11)	2013 (Gain) / Loss	($7,378,716)
(12)	40% of 2013 (Gain) / Loss	($2,951,487)
(13)	2012 (Gain) / Loss	($3,370,132)
(14)	20% of 2012 (Gain) / Loss	($674,026)
(15)	Actuarial value on January 1, 2016, (6) + (8) + (10) + (12) + (14) but not less than 90% nor greater than 110% of (6)	$99,832,849
(16)	Ratio of actuarial value to market value	101.70%
(17)	Actuarial Value Return for 2014	10.73%
(18)	Actuarial Value Return for 2015	8.16%
(19)	Market Value Return for 2014	9.07%
(20)	Market Value Return for 2015	0.48%

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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	$114,519,810	$119,047,013
Actuarial Assets	82,514,065	99,832,849
Unfunded Actuarial Accrued Liability	$32,005,745	$19,214,164
Funded Status	72.1%	83.9%

Appropriations

The pension appropriation for the upcoming fiscal years have been calculated in accordance with the requirements set forth in Section 22D of Chapter 32 of the Massachusetts General Laws. These amounts were calculated to comply with the June 30, 2030, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Employer normal cost,
- Level amortization of the unfunded actuarial accrued liability by June 30, 2020
  $ 19,214,164 over 4 years
- Interest adjustment for payments deposited at the various times in the year

The pension appropriation is shown in Table VII.

Table VII

	January 1, 2014	January 1, 2016
Normal cost	$855,948	$568,488
Amortization payment of the prior accrued liability	4,324,860	7,553,182
Amortization payment of current (gains)/losses	152,041	(2,216,693)
Total cost	$5,332,849	$5,904,977
% of Pay	22.3%	24.9%
Fiscal 2017 cost	$6,127,778	$6,127,778
Fiscal 2018 cost	$6,378,506	$6,252,284

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 4.0% per year. The employee contribution rate is expected to increase to 10.5% by 2042 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 6 years until the unfunded liabilities are substantially paid off, at which time only the normal cost will remain. The total cost represents about 25% of payroll, decreasing to 23.5% by the time the unfunded liabilities are fully paid off, leaving only a normal cost of about 2% 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	$23,692,881	$2,047,500	$598,369	$5,529,409	$6,127,778	25.9	83.8
2018	$24,640,596	$2,147,715	$603,026	$5,649,258	$6,252,284	25.4	87.6
2019	$25,626,220	$2,252,670	$607,099	$5,652,483	$6,259,582	24.4	91.7
2020	$26,651,269	$2,362,586	$610,533	$5,654,080	$6,264,613	23.5	95.8
2021	$27,717,320	$2,477,691	$613,270	$0	$613,270	2.2	100.0
2022	$28,826,012	$2,598,224	$615,249	$0	$615,249	2.1	100.0
2023	$29,979,053	$2,724,435	$616,406	$0	$616,406	2.1	100.0
2024	$31,178,215	$2,856,586	$616,670	$0	$616,670	2.0	100.0
2025	$32,425,344	$2,994,950	$615,970	$0	$615,970	1.9	100.0
2026	$33,722,357	$3,139,813	$614,226	$0	$614,226	1.8	100.0
2027	$35,071,252	$3,291,473	$611,358	$0	$611,358	1.7	100.0
2028	$36,474,102	$3,450,242	$607,278	$0	$607,278	1.7	100.0
2029	$37,933,066	$3,616,446	$601,892	$0	$601,892	1.6	100.0
2030	$39,450,388	$3,790,425	$595,105	$0	$595,105	1.5	100.0
2031	$41,028,404	$3,972,537	$586,811	$0	$586,811	1.4	100.0
2032	$42,669,540	$4,163,154	$576,902	$0	$576,902	1.4	100.0
2033	$44,376,322	$4,362,663	$565,261	$0	$565,261	1.3	100.0
2034	$46,151,375	$4,571,473	$551,765	$0	$551,765	1.2	100.0
2035	$47,997,430	$4,790,006	$536,286	$0	$536,286	1.1	100.0
2036	$49,917,327	$5,018,708	$518,685	$0	$518,685	1.0	100.0
2037	$51,914,020	$5,258,043	$498,819	$0	$498,819	1.0	100.0
2038	$53,990,581	$5,508,494	$476,533	$0	$476,533	0.9	100.0
2039	$56,150,204	$5,770,568	$451,666	$0	$451,666	0.8	100.0
2040	$58,396,212	$6,044,794	$424,048	$0	$424,048	0.7	100.0
2041	$60,732,061	$6,331,726	$393,497	$0	$393,497	0.6	100.0
2042	$63,161,343	$6,631,941	$359,823	$0	$359,823	0.6	100.0
2043	$65,687,797	$6,897,219	$374,216	$0	$374,216	0.6	100.0
2044	$68,315,309	$7,173,107	$389,185	$0	$389,185	0.6	100.0
2045	$71,047,921	$7,460,032	$404,752	$0	$404,752	0.6	100.0
2046	$73,889,838	$7,758,433	$420,942	$0	$420,942	0.6	100.0
2047	$76,845,431	$8,068,770	$437,780	$0	$437,780	0.6	100.0
2048	$79,919,248	$8,391,521	$455,291	$0	$455,291	0.6	100.0

* Calendar basis

** Beginning of Fiscal Year

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PERAC Annual Statement
APPENDIX PAGE 3
ACTUARIAL VALUATION AND ASSUMPTIONS

The most recent actuarial valuation of the System was prepared by Sherman Actuarial Services as of January 1, 2016.

The normal cost for employees on that date was:	$2,047,500	8.6% of pay
The normal cost for the employer was:	468,488	2.0% of pay

The actuarial liability for active members was:	$53,692,767
The actuarial liability for retired and inactive members was:	65,354,246
Total actuarial accrued liability:	119,047,013
System assets as of that date:	99,832,849
Unfunded actuarial accrued liability:	$19,214,164

The ratio of system's assets to total actuarial liability was 83.9%

The principal actuarial assumptions used in the valuation are as follows:

Investment Return:	7.50%
Rate of Salary Increase:	3.50%

SCHEDULE OF FUNDING PROGRESS

Actuarial Valuation Date	Actuarial Value of Assets (a)	Actuarial Accrued Liability (b)	Unfunded Actuarial Accrued Liability (b-a)	Funded Ratio (a/b)	Covered Payroll (c)	UAAL as a percent of Covered Payroll (b-a)/c
01/01/16	$99,832,849	$119,047,013	$19,214,164	83.9%	$23,692,881	81.1%
01/01/14	82,514,065	114,519,810	32,005,745	72.1%	23,896,051	133.9%
01/01/12	71,863,914	105,086,411	33,222,497	68.4%	22,671,647	146.5%
01/01/10	64,467,201	91,059,541	26,592,340	70.8%	22,460,537	118.4%
01/01/08	65,665,411	85,256,692	19,591,281	77.0%	22,402,987	87.4%
01/01/06	54,147,807	75,979,303	21,831,496	71.3%	19,896,839	109.7%
01/01/04	50,857,118	65,276,552	14,419,434	77.9%	17,995,844	80.1%
01/01/02	46,779,157	59,312,723	12,533,566	78.9%	16,773,825	74.7%
01/01/00	48,071,979	49,486,969	1,414,990	97.1%	14,064,649	10.1%

Attach Copy of Current Approved Funding Schedule

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	7	0	0	0	0	0	0	0	0	7
	32,910	0	0	0	0	0	0	0	0	32,910
25-29	41	6	0	0	0	0	0	0	0	47
	44,277	44,067	0	0	0	0	0	0	0	44,250
30-34	23	19	6	0	0	0	0	0	0	48
	43,302	47,282	64,104	0	0	0	0	0	0	47,478
35-39	15	7	14	3	0	0	0	0	0	39
	39,509	60,672	62,533	56,746	0	0	0	0	0	52,898
40-44	25	8	5	11	2	0	0	0	0	51
	43,985	56,592	46,073	61,268	67,256	0	0	0	0	50,808
45-49	21	22	13	6	12	1	0	0	0	75
	35,489	34,956	38,112	61,822	77,223	49,610	0	0	0	44,760
50-54	14	24	16	13	8	13	5	0	0	93
	43,815	33,846	41,519	49,421	67,222	78,279	57,011	0	0	49,171
55-59	4	21	18	8	4	5	3	3	0	66
	42,889	24,693	33,537	38,418	63,835	71,451	85,004	92,999	0	41,632
60-64	6	6	17	7	5	8	5	1	2	57
	32,006	32,117	32,250	56,857	50,381	50,929	72,200	75,948	103,598	46,219
65-69	2	5	2	6	3	5	1	0	0	24
	34,571	21,821	22,629	34,916	62,211	58,072	88,585	0	0	41,608
70+	0	1	0	0	1	1	0	0	1	4
	0	20,369	0	0	31,327	19,972	0	0	67,257	34,731
Total Employees	158	119	91	54	35	33	14	4	3	511
Average Salary	41,300	37,498	42,279	51,341	66,405	64,917	70,689	88,737	91,484	46,366

Exhibit 2 - Retiree Distribution as of January 1, 2016

	Number of Employees			Total Payments		
Attained Age	Female	Male	Total	Female	Male	Total
< 20	1	0	0	19,358	0	19,358
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	24,792	0	24,792
45-49	0	0	0	0	0	0
50-54	1	2	3	11,641	6,060	17,700
55-59	4	10	14	49,392	312,578	361,970
60-64	7	22	29	156,232	967,374	1,123,606
65-69	19	32	51	424,096	1,328,842	1,752,938
70-74	20	23	43	354,338	765,840	1,120,178
75-79	13	4	17	283,292	116,962	400,254
80-84	23	8	31	320,679	157,443	478,123
85-89	14	17	31	141,833	358,640	500,473
90-94	5	4	9	48,685	44,480	93,165
95+	5	0	5	26,509	0	26,509
Total	113	122	234	1,860,847	4,058,219	5,919,066
Average (Age/Payment)	76.02	71.1	73.47	16,468	33,264	25,295
Frequency Percent	48.3	51.7	100.0	31.4	68.6	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	1	1	0	55,241	55,241
40-44	1	0	1	22,674	0	22,674
45-49	0	2	2	0	87,215	87,215
50-54	0	1	1	0	26,209	26,209
55-59	2	3	5	22,443	127,542	149,985
60-64	0	5	5	0	162,579	162,579
65-69	0	6	6	0	172,032	172,032
70-74	0	4	4	0	102,372	102,372
75-79	1	1	2	49,695	24,124	73,819
80-84	0	3	3	0	76,979	76,979
85-89	0	0	0	0	0	0
90-94	0	2	2	0	48,864	48,864
95-99	0	0	0	0	0	0
Total	4	28	32	94,812	883,157	977,969
Average (Age/Payment)	58.0	66.9	65.8	23,703	31,541	30,562
Frequency Percent	12.5	87.5	100.0	9.7	90.3	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	$9,191,127	$2,047,500	$6,127,778	$7,408,593	$6,392,745
2017	8,294,775	2,147,715	6,252,284	7,839,216	7,944,440
2018	8,588,693	2,252,670	6,259,582	8,426,048	8,349,607
2019	8,897,415	2,362,586	6,264,613	9,044,601	8,774,386
2020	9,207,541	2,477,691	613,270	9,574,584	3,458,003
2021	9,532,459	2,598,224	615,249	9,826,022	3,507,036
2022	9,832,041	2,724,435	616,406	10,082,277	3,591,077
2023	10,161,261	2,856,586	616,670	10,343,961	3,655,957
2024	10,448,353	2,994,950	615,970	10,612,290	3,774,857
2025	10,757,343	3,139,813	614,226	10,888,970	3,885,666
2026	11,075,472	3,291,473	611,358	11,173,874	4,001,233
2027	11,403,009	3,450,242	607,278	11,467,361	4,121,872
2028	11,740,232	3,616,446	601,892	11,769,815	4,247,922
2029	12,087,427	3,790,425	595,105	12,081,644	4,379,746
2030	12,444,891	3,972,537	586,811	12,403,284	4,517,741
2031	12,812,926	4,163,154	576,902	12,735,201	4,662,332
2032	13,191,844	4,362,663	565,261	13,077,895	4,813,974
2033	13,581,969	4,571,473	551,765	13,431,898	4,973,167
2034	13,983,631	4,790,006	536,286	13,797,779	5,140,440
2035	14,397,171	5,018,708	518,685	14,176,151	5,316,373
2036	14,822,941	5,258,043	498,819	14,567,668	5,501,589
2037	15,261,302	5,508,494	476,533	14,973,033	5,696,758
2038	15,712,627	5,770,568	451,666	15,392,998	5,902,605
2039	16,177,299	6,044,794	424,048	15,828,370	6,119,913
2040	16,655,713	6,331,726	393,497	16,280,018	6,349,528
2041	17,148,275	6,631,941	359,823	16,748,872	6,592,362
2042	17,655,403	6,897,219	374,216	17,233,365	6,849,397
2043	18,177,529	7,173,107	389,185	17,736,933	7,121,696
2044	18,715,096	7,460,032	404,752	18,260,719	7,410,407
2045	19,273,788	7,758,433	420,942	18,805,758	7,711,346

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. <u>Service Retirement</u>

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 $250 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 $250 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 $12,000. 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. The previous valuation used 8.0%.

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 $12,000 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, gully generational. Mortality for retired members for Group 1 and 2 is represented by the RP-2000 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-2000 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 30% of all disabilities are ordinary (70% are service connected). For police and fire employees, 5% of all disabilities are assumed to be ordinary (95% 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 $100,000 and is anticipated to increase at 4.0% per year.

EXHIBIT 7 – GLOSSARY OF TERMS:

This glossary summarizes the technical terms contained in this report.

1. Actuarial Accrued Liability

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

2. Actuarial Assumptions

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. Actuarial Cost Method

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

4. Actuarial Present Value

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. Forecast

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 Shrewsbury 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

Daniel W. Sherman, ASA, MAAA

June, 2016

BREAKOUTS

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Breakouts

	Total	Housing	Light	Cable	Water	Sewer	Custodians	All Others	School Employees	School Lunch
(1) Participants										
(a) Actives	511	10	36	30	13	3	22	164	212	21
(b) Inactives	125	0	1	7	0	0	1	17	94	5
(c) Retirees and Benefiaries	235	4	23	7	9	1	22	127	29	13
(d) Disabled Retirees	32	0	3	0	1	0	3	22	2	1
(e) Total	903	14	63	44	23	4	48	330	337	40
(2) Payroll of Active Participants	$23,692,881	$564,131	$2,769,465	$1,888,963	$724,486	$148,200	$969,948	$9,817,926	$6,385,773	$423,989
(3) Normal Cost										
(a) Total Normal Cost	2,515,988	47,693	299,913	181,630	70,459	13,982	115,293	1,063,363	676,486	47,168
(b) Expected Employee Contributions	2,047,500	43,579	238,257	172,652	60,179	12,029	82,192	862,187	541,587	34,838
(c) Administrative Expenses	100,000	1,896	11,920	7,219	2,800	556	4,582	42,264	26,887	1,875
(d) Net Employer Normal Cost (a) - (b) + (c)	568,488	6,010	73,576	16,197	13,080	2,509	37,683	243,440	161,786	14,205
(4) Actuarial Accrued Liability	119,047,013	1,903,340	19,480,769	4,896,312	3,614,981	587,134	6,381,456	65,354,301	14,531,995	2,296,721
(5) Assets*	99,832,849	1,532,787	18,325,775	4,167,089	2,911,196	472,827	5,139,079	53,731,685	11,702,825	1,849,583
(6) Unfunded Actuarial Accrued Liability (4) - (5)	19,214,164	370,553	1,154,994	729,223	703,785	114,307	1,242,377	11,622,616	2,829,170	447,138
(7) Amortizations*	5,336,488	102,916	320,785	202,532	195,467	31,747	345,054	3,228,033	785,766	124,187
(8) Total Required Employer Contributions (3d) + (7)	5,904,976	108,926	394,361	218,729	208,548	34,256	382,738	3,471,475	947,552	138,392
(9) Fiscal 2018 Cost	6,252,284	115,332	417,556	231,594	220,814	36,271	405,249	3,675,654	1,003,283	146,531
(10) Fiscal 2019 Cost	6,259,582	115,467	418,043	231,864	221,072	36,313	405,722	3,679,944	1,004,454	146,702
(11) Fiscal 2020 Cost	6,264,613	115,560	418,379	232,050	221,250	36,342	406,048	3,682,901	1,005,261	146,820
(12) Fiscal 2021 Cost	613,270	11,313	40,957	22,716	21,659	3,558	39,750	360,535	98,409	14,373
(13) Fiscal 2022 Cost	615,249	11,350	41,089	22,789	21,729	3,569	39,878	361,699	98,727	14,419
(14) Fiscal 2023 Cost	616,406	11,371	41,166	22,832	21,770	3,576	39,953	362,378	98,913	14,446
(15) Fiscal 2024 Cost	616,670	11,376	41,184	22,842	21,779	3,578	39,970	362,532	98,955	14,452
(16) Fiscal 2025 Cost	615,970	11,363	41,137	22,816	21,754	3,574	39,925	362,121	98,843	14,436
(17) Fiscal 2026 Cost	614,226	11,331	41,021	22,751	21,692	3,564	39,812	361,097	98,563	14,395
(18) Percentage of Total Cost	100.0%	1.8%	6.7%	3.7%	3.5%	0.6%	6.5%	58.8%	16.0%	2.3%
(19) Funded Ratio	83.86%	80.53%	94.07%	85.11%	80.53%	80.53%	80.53%	82.22%	80.53%	80.53%

* Allocation is based on the ratio of the Unfunded Actuarial Accrued Liability, adjusted for additional contributions.