

**PLYMOUTH COUNTY  
CONTRIBUTORY RETIREMENT SYSTEM**

Actuarial Valuation Report

January 1, 2004

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## **Introduction**

This report presents the Plymouth County actuarial valuation findings as of January 1, 2004, under the Commonwealth of Massachusetts Retirement System.

The actuarial valuation is based on:

- Provisions Chapter 32 of the Massachusetts General Laws, "M.G.L", as of January 1, 2004.
- Employee data provided by the Retirement Board
- Asset information reported to the Public Employee Retirement Administration Commission by the Plymouth County Contributory 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, 2004.

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 since the last actuarial valuation, the total unfunded actuarial accrued liability increased by 5.69% to \$282,053,648. The increase is the result of net unfavorable actuarial experience during the preceding years. The primary component of the unfavorable experience was an investment return less than the 8.5% assumption and several ERI elections. This was partially offset by less than expected salary increases.

## 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**

	<u>January 1, 2002</u>	<u>January 1, 2004</u>
Superannuation	\$16,099,630	\$17,839,804
Death	986,359	1,313,134
Disability	2,869,642	4,142,545
Terminations	2,073,283	3,410,061
Administrative Expenses	<u>500,000</u>	<u>675,000</u>
Total Normal Cost	22,528,914	27,380,544
% of Pay	11.0%	13.1%
Employee Contributions	16,329,440	16,765,042
% of Pay	8.0%	8.0%
Employer Normal Cost	\$6,199,474	\$10,615,502
% of Pay	3.0%	5.1%

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**Present Value of Actuarial Accrued Liabilities**

The present value of actuarial accrued liabilities (AAL) represents today's value of all benefits earned by the actives and inactive. 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**

	<u>January 1, 2002</u>	<u>January 1, 2004</u>
Actives		
Superannuations	\$381,274,170	\$413,220,088
Death	11,073,300	\$10,593,516
Disability	32,512,217	\$24,994,252
Terminations	2,750,135	(\$10,527,808)
Inactives		
Retirees	232,184,933	285,833,381
Disabled Retirees	68,670,922	71,774,787
Inactives	<u>4,732,527</u>	<u>6,270,237</u>
Total	\$733,198,204	\$802,158,453

**Present Value of Future Benefits**

The present value of future benefits represents today's value of all benefits earned by the inactive as well as all benefits earned and expected to be earned in the coming years by the active. 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**

	<u>January 1, 2002</u>	<u>January 1, 2004</u>
Actives		
Superannuation	\$530,448,059	\$569,176,495
Death	20,141,239	21,715,095
Disability	62,705,493	59,669,665
Terminations	21,643,631	19,118,679
Retirees and Inactives		
Retirees	232,184,933	285,833,381
Disabled Retirees	68,670,922	71,774,787
Inactives	<u>4,732,527</u>	<u>6,270,237</u>
Total	\$940,526,804	\$1,033,558,339

## 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**

	<u>January 1, 2002</u>	<u>January 1, 2004</u>
Cash equivalents	17,900,034	\$5,814,454
Short term investments	3,944,689	3,717,030
Fixed income securities	69,314,844	124,558,124
Equities	237,221,717	252,199,825
International	58,538,455	38,453,878
Real Estate	23,048,184	34,344,025
Venture Capital	0	0
Other	12,176,644	10,288,856
Accounts receivable	1,564,423	12,092,232
Accounts payable	(67,879)	(2,792,578)
Accrued income	<u>291,307</u>	<u>277,426</u>
Total Market Value	\$423,932,418	\$478,953,272
Total Actuarial Value	\$466,325,660	\$520,104,805



**Actuarial Value of Assets**

The actuarial value of assets is determined by projecting the actuarial value of assets as of the beginning of the prior plan year with the assumed rate of return during that year (8.5%) 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 10%. The calculation of the actuarial value of assets as of January 1, 2004 is presented in Table V.

**Table V**

	<u>January 1, 2004</u>
(1) Market value at January, 1, 2003	\$379,029,765
(2) 2003 Contributions	44,588,330
(3) 2003 Benefit payments	(43,138,980)
(4) Net interest adjustment at 8.5% on (1), (2), and (3) to December 31, 2003	32,279,127
(5) Expected market value on January, 1, 2004	<u>\$412,758,241</u>
(1) + (2) + (3) + (4)	
(6) Actual market value on January, 1, 2004	\$478,953,272
(7) 2003 Gain	(66,195,031)
(8) 80% of 2003 gain	(52,956,024)
(9) 2002 Loss	90,663,551
(10) 60% of 2002 loss	54,398,131
(11) 2001 Loss	87,495,731
(12) 40% of 2001 loss	34,998,293
(13) 2000 Loss	23,555,674
(14) 20% of 2001 loss	4,711,135
(15) Actuarial value on January, 1, 2004	
(6) + (8) + (10) + (12) + (14) but not less than 90% or more than 110% of (6)	\$520,104,805
(16) Ratio of actuarial value to market value	108.59%

**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**

	<u>January 1, 2002</u>	<u>January 1, 2004</u>
Actuarial Accrued Liability	\$733,198,204	\$802,158,453
Actuarial Assets	<u>466,325,660</u>	<u>520,104,805</u>
Unfunded Actuarial Accrued Liability	\$266,872,544	\$282,053,648
Funded Status	63.6%	64.8%

**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, 2028, full funding mandate for all accrued liabilities. The pension appropriation is the sum of the:

- Employer normal cost,
- Increasing amortization of the prior unfunded actuarial accrued liability by June 30, 2026  
     \$ 273,984,964 over 22 years with 4.5 % increasing payments
- Level amortization of the Early Retirement Incentive unfunded liability by June 30, 2008  
     \$ 8,068,684 over 5, 15, 15 years
- Interest adjustment for payments deposited semiannually.

The pension appropriation is shown in Table VII.

**Table VII**

	<u>January 1, 2002</u>	<u>January 1, 2004</u>
Normal cost	\$6,199,474	\$10,615,502
Amortization of the unfunded accrued liability	15,756,007	17,961,084
Amortization payment of ERI	77,732	634,091
Total cost	\$22,033,213	\$29,210,677
% of Pay	10.7%	14.0%
Fiscal 2005 cost	\$25,695,625	\$25,695,625
Fiscal 2006 cost	\$26,568,200	\$32,908,422
Fiscal 2007 cost	\$27,470,200	\$34,085,524

## **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 2028 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 22 years until the unfunded liabilities are completely paid off, at which time only the normal cost will remain. The total cost represents 12.3% of payroll, increasing next year to 15.1%, decreasing to 12.4% by the time the unfunded liabilities are fully paid off, leaving only a normal cost of 2.9% 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  
(amounts in thousands)**

Fiscal Year Ending	Employee Payroll*	Employee Contribution	Employer Normal Cost with Interest	Amortization Payments with Interest	Employer Total Cost with Interest	Employer Total Cost % of Payroll	Funded Ratio %**
2005	\$208,312	\$16,765	\$11,283	\$14,413	\$25,696	12.3	64.8
2006	217,686	17,752	11,544	21,364	32,908	15.1	65.9
2007	227,482	18,793	11,806	22,280	34,086	15.0	67.6
2008	237,719	19,892	12,068	23,236	35,304	14.9	69.2
2009	248,416	21,052	12,329	24,236	36,565	14.7	70.9
2010	259,595	22,276	12,590	25,198	37,788	14.6	72.5
2011	271,276	23,568	12,849	26,289	39,138	14.4	74.0
2012	283,484	24,930	13,106	27,430	40,536	14.3	75.6
2013	296,241	26,368	13,360	28,622	41,982	14.2	77.1
2014	309,571	27,885	13,611	29,868	43,478	14.0	78.7
2015	323,502	29,484	13,856	31,170	45,026	13.9	80.2
2016	338,060	31,172	14,097	32,530	46,627	13.8	81.8
2017	353,272	32,951	14,331	33,952	48,283	13.7	83.3
2018	369,170	34,827	14,558	35,437	49,995	13.5	84.9
2019	385,782	36,806	14,776	36,989	51,765	13.4	86.5
2020	403,143	38,892	14,984	38,021	53,004	13.1	88.1
2021	421,284	41,091	15,181	39,367	54,548	12.9	89.7
2022	440,242	43,409	15,365	41,139	56,504	12.8	91.4
2023	460,053	45,853	15,535	42,990	58,525	12.7	93.0
2024	480,755	48,429	15,689	44,924	60,614	12.6	94.7
2025	502,389	51,144	15,826	46,946	62,772	12.5	96.5
2026	524,996	54,005	15,943	49,059	65,002	12.4	98.2
2027	548,621	57,020	16,039	0	16,039	2.9	100.0
2028	573,309	60,197	16,111	0	16,111	2.8	100.0
2029	599,108	62,906	16,836	0	16,836	2.8	100.0
2030	626,068	65,737	17,594	0	17,594	2.8	100.0
2031	654,241	68,695	18,386	0	18,386	2.8	100.0
2032	683,682	71,787	19,213	0	19,213	2.8	100.0
2033	714,448	75,017	20,078	0	20,078	2.8	100.0
2034	746,598	78,393	20,981	0	20,981	2.8	100.0
2035	780,195	81,920	21,925	0	21,925	2.8	100.0
2036	815,303	85,607	22,912	0	22,912	2.8	100.0

\* Calendar basis

\*\* As of beginning of the Fiscal Year

**GAS No. 25 and GAS No. 27**

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 GAS 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 GAS 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**

	<u>January 1, 2002</u>	<u>January 1, 2004</u>
(1) Actuarial Accrued Liability	\$733,198,204	\$802,158,453
(2) Actuarial Value of Assets	<u>466,325,660</u>	<u>520,104,805</u>
(3) Unfunded Actuarial Accrued Liability	266,872,544	282,053,648
(4) Funded Ratio (2)/(1)	63.6%	64.8%
(5) Covered Payroll	\$205,039,686	\$208,312,002
(6) UAAL as a percentage of payroll: (3)/(5)	130.2%	135.4%
(7) Annual Required Contribution (ARC)	\$23,437,831	\$25,695,625
(8) Net Pension Obligation	\$0	\$0

**PERAC Annual Statement**  
**APPENDIX PAGE 3**  
**ACTUARIAL VALUATION AND ASSUMPTIONS**

The most recent actuarial valuation of the System was prepared by Mellon Human Resources & Investor Solutions as of January 1, 2004.

The normal cost for employees on that date was:	\$16,765,042	8.0% of pay
The normal cost for the employer was:	9,940,502	4.8% of pay
The actuarial liability for active members was:		\$438,280,048
The actuarial liability for retired members was:		363,878,405
Total actuarial accrued liability:		802,158,453
System assets as of that date:		520,104,805
Unfunded actuarial accrued liability:		\$282,053,648
The ratio of system's assets to total actuarial liability was		64.8%

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

Investment Return:	8.5%
Rate of Salary Increase:	5.5%

**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
01/01/04	\$520,104,805	\$802,158,453	\$282,053,648	64.8%	\$208,312,002	135.4%
01/01/02	466,325,660	733,198,204	266,872,544	63.6%	205,039,686	130.2%
01/01/00	450,210,619	611,204,058	160,993,439	73.7%	178,010,731	90.4%
01/01/98	316,253,566	492,303,777	176,050,211	64.2%	148,264,981	118.7%
01/01/96	222,822,638	359,461,980	136,639,342	62.0%	136,768,169	99.9%

Attach Copy of Current Approved Funding Schedule

## **EXHIBITS**



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Age/Service Distribution with Salary as of January 1, 2004

Attained Age	Average Salary	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40+	Total
	<5									
< 20	2 3,840	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	2 3,840
20-24	94 17,500	0 0	0 0	0 0	0 0	0 0	0 0	0 0	0 0	94 17,500
25-29	417 20,925	56 31,837	0 0	0 0	0 0	0 0	0 0	0 0	0 0	473 22,217
30-34	254 29,842	182 43,711	28 41,917	1 34,776	0 0	0 0	0 0	0 0	0 0	465 36,008
35-39	278 26,496	212 41,561	106 44,785	62 48,556	0 0	0 0	0 0	0 0	0 0	658 36,374
40-44	465 19,445	251 31,106	120 41,950	123 49,377	28 54,996	2 53,349	0 0	0 0	0 0	989 29,933
45-49	464 18,859	338 23,453	127 31,917	143 44,211	94 53,889	34 55,223	2 52,955	0 0	0 0	1,202 28,371
50-54	286 20,256	300 23,387	199 29,019	169 36,386	66 49,712	79 55,853	45 57,605	1 51,790	0 0	1,145 30,630
55-59	200 21,918	185 27,569	129 28,576	171 30,524	94 37,978	79 48,900	70 60,084	23 53,297	0 0	951 32,865
60-64	95 22,779	95 24,788	94 25,117	107 32,442	67 32,430	60 38,279	43 48,587	13 63,072	5 57,613	579 31,119
65-69	32 17,809	39 23,550	28 29,358	33 31,782	15 32,649	22 35,820	12 38,176	3 38,946	1 62,367	185 28,510
70+	15 16,414	16 15,345	10 15,693	16 20,231	14 17,280	8 31,514	9 49,669	7 33,720	0 0	95 22,626
Total Employees	2,602	1,674	841	825	378	284	181	47	6	6,838
Average Salary	21,627	29,820	33,067	38,368	43,283	47,876	54,687	52,137	58,405	30,464

Retiree Distribution as of January 1, 2004

Attained Age	Number of Employees			Total Payments		
	Male	Female	Total	Male	Female	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	7,508	0	7,508
40-44	4	4	8	82,677	27,816	110,493
45-49	5	6	11	89,206	46,809	136,015
50-54	21	15	36	526,889	125,762	652,651
55-59	104	89	193	2,983,197	890,473	3,873,670
60-64	172	182	354	4,525,770	1,859,803	6,385,573
65-69	209	248	457	4,286,895	2,742,975	7,029,870
70-74	207	256	463	3,177,379	2,457,404	5,634,783
75-79	181	255	436	2,399,848	2,062,814	4,462,662
80-84	136	202	338	1,435,326	1,246,429	2,681,756
85-89	69	101	170	553,941	634,026	1,187,967
90-94	41	35	76	268,369	241,095	509,464
95-99	20	6	26	123,892	30,009	153,900
Total	1,170	1,399	2,569	20,460,897	12,365,415	32,826,312
Average (Age/Payment)	72	73	72.6	17,488	8,839	12,778
Frequency Percent	45.5	54.5	100	62.3	37.7	100

Disabled Retiree Distribution as of January 1, 2004

Attained Age	Number of Employees			Total Payments		
	Male	Female	Total	Male	Female	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	6	0	6	184,013	0	184,013
40-44	10	6	16	274,116	174,758	448,873
45-49	19	2	21	503,747	34,662	538,408
50-54	40	7	47	981,333	94,614	1,075,947
55-59	58	5	63	1,347,108	110,817	1,457,924
60-64	54	6	60	1,313,012	118,585	1,431,597
65-69	48	1	49	1,038,993	65	1,039,058
70-74	34	3	37	669,640	20,512	690,153
75-79	17	1	18	272,257	24,148	296,405
80-84	15	0	15	235,110	0	235,110
85-89	4	0	4	55,132	0	55,132
90-94	1	0	1	14,160	0	14,160
95-99	0	0	0	0	0	0
Total	306	31	337	6,888,621	578,159	7,466,780
Average (Age/Payment)	62.2	56.2	61.6	22,512	18,650	22,157
Frequency Percent	90.8	9.2	100	92.3	7.7	100

**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
2004	\$43,762	\$16,765	\$25,696	\$43,615	\$42,314
2005	46,950	17,752	32,908	47,279	50,989
2006	50,312	18,793	34,086	51,552	54,119
2007	53,784	19,892	35,304	56,090	57,502
2008	57,551	21,052	36,565	60,908	60,974
2009	61,515	22,276	37,788	66,016	64,565
2010	65,566	23,568	39,138	71,433	68,573
2011	69,677	24,930	40,536	77,192	72,981
2012	74,134	26,368	41,982	83,318	77,534
2013	78,664	27,885	43,478	89,833	82,532
2014	83,451	29,484	45,026	96,768	87,827
2015	88,436	31,172	46,627	104,151	93,514
2016	93,523	32,951	48,283	112,020	99,731
2017	98,850	34,827	49,995	120,415	106,387
2018	104,103	36,806	51,765	129,385	113,853
2019	109,356	38,892	53,004	138,986	121,526
2020	114,681	41,091	54,548	149,250	130,208
2021	119,850	43,409	56,504	160,273	140,336
2022	125,008	45,853	58,525	172,167	151,537
2023	130,029	48,429	60,614	185,028	164,042
2024	134,928	51,144	62,772	198,968	177,956
2025	139,506	54,005	65,002	214,113	193,614
2026	143,905	57,020	16,039	229,541	158,695
2027	148,054	60,197	16,111	243,043	171,297
2028	151,644	62,906	16,836	257,608	185,706
2029	154,880	65,737	17,594	273,420	201,871
2030	157,372	68,695	18,386	290,644	220,353
2031	159,199	71,787	19,213	309,475	241,276
2032	160,395	75,017	20,078	330,118	264,818
2033	165,779	78,393	20,981	352,596	286,191

amounts in thousands

## **EXHIBIT 5 – SUMMARY OF PLAN PROVISIONS:**

This summary is prepared in accordance with Chapter 32 as of January 1, 2004, and does not take into account any subsequent changes.

### **1. Administration**

Each of the 107 contributory retirement systems for public employees for 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.

### 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:

<b><u>Date of Hire</u></b>	<b><u>Member Contribution Rate</u></b>
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

### 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.)

### 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
- (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) if an employee is a State Police officer (Group 3), attainment of age 50

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:

<u>Age at Retirement</u>	<u>Percentage of Average Salary</u>		
	<u>Group 1</u>	<u>Group 2</u>	<u>Group 4</u>
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 Group 3 (State Police), the benefit is 50% of the participant's final year's rate of regular salary, plus an additional 1% for each year of service in excess of 20 years. In addition, for veterans (all groups) there is an additional benefit of \$15 per year for each year of service, up to a maximum of 20 years of service.



**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. Members with ten or more years of service are entitled to 100% of the credited interest on their contributions. Members with five to ten years of service are entitled to 50% of the credited interest on their contributions. No credited interest is provided for members with less than five years of service.

**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).

### b. Benefit Amount:

The ordinary disability amount is equal to the accrued retirement benefit as if the member were age 55. 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, 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, 2004.

### **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 8.5% per annum.

### **5. Salary Scale**

It is assumed that salaries including longevity will increase at a rate of 5.5% 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 gains and losses.

**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:

<u>Service</u>	<u>General Employees</u>	<u>Police and Fire Employees</u>
0	0.1500	0.0150
10	0.0540	0.0150
20	0.0200	0.0000
30	0.0000	0.0000

**9. Annual Rate of Mortality**

It is assumed that both preretirement and postretirement mortality are represented by the RP-2000 Mortality Table for males and females. Mortality for disabled members is represented by the RP-2000 Mortality Table set forward two years for all disabled members.

**10. Service Retirement**

Based on an analysis of experience, the assumed annual retirement rates are illustrated at the following ages:

<u>Age</u>	<u>Male General Employees</u>	<u>Female General Employees</u>	<u>Male and Female Police and Fire Employees</u>
50	0.0100	0.0150	0.02000
51	0.0100	0.0150	0.02000
52	0.0100	0.0200	0.02000
53	0.0100	0.0250	0.05000
54	0.0200	0.0250	0.07500
55	0.0200	0.0550	0.15000
56	0.0250	0.0650	0.10000
57	0.0250	0.0650	0.10000
58	0.0500	0.0650	0.10000
59	0.0650	0.0650	0.15000
60	0.1200	0.0500	0.20000
61	0.2000	0.1300	0.20000
62	0.3000	0.1500	0.25000
63	0.2500	0.1250	0.25000
64	0.2200	0.1800	0.30000
65	0.4000	0.1500	1.00000
66	0.2500	0.2000	1.00000
67	0.2500	0.2000	1.00000
68	0.3000	0.2500	1.00000
69	0.3000	0.2000	1.00000
70	1.0000	1.0000	1.00000

**11. 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:

<b><u>Attained Age</u></b>	<b><u>General Employees</u></b>	<b><u>Police and Fire Employees</u></b>
20	0.0001	0.0010
30	0.0003	0.0030
40	0.0010	0.0030
50	0.0019	0.0125

In addition, it is assumed for the general employees that 45% of all disabilities are ordinary (55% are service connected). For police and fire employees, 10% of all disabilities are assumed to be ordinary (90% are service connected).

**12. 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.

**13. 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 2004 is \$675,000 and is anticipated to increase at 4.5% 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 Plymouth County Contributory Retirement System contributing as of January 1, 2004, 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 is reasonably related to plan experience and to reasonable expectations, and represents our best estimate of anticipated plan experience.

Mellon Human Resources and Investor Solutions

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Daniel W. Sherman, ASA, MAAA  
Enrolled Actuary No. 99-4086

August 2004