

The experience and dedication you deserve

January 19, 2017

Ms. Brenda Halpin, Director State of Connecticut Office of the State Comptroller Retirement Services Division 55 Elm Street Hartford, CT 06106

Dear Ms. Halpin:

Enclosed is the "Report on the Biennial Valuation of the Connecticut Policemen and Firemen Survivors' Benefit Fund" prepared as of June 30, 2016.

Please let us know if there are any questions concerning the report.

Sincerely yours,

John J. Garrett, ASA, FCA, MAAA Principal and Consulting Actuary Edward J. Koebel, EA, FCA, MAAA Principal and Consulting Actuary

Edward J. Worbel

JJG/EJK/KC

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January 19, 2017

State of Connecticut State Employees Retirement Commission 55 Elm Street Hartford, CT 06106

Members of the Commission:

Connecticut General Statutes Section 7-113 governs the operation of the Connecticut Policemen and Firemen Survivors' Benefit Fund (SBF). At the direction of the Commission, the actuary makes periodic valuations of the contingent assets and liabilities of the Benefit Fund. This report provides the results of the biennial actuarial valuation of the SBF prepared as of June 30, 2016. In preparing the valuation, the actuary relied on data provided by the Comptroller's Office. While not verifying data at the source, the actuary performed tests for consistency and reasonableness.

This valuation results in a decrease to the required employer normal contribution rate for the 2018 fiscal year from 1.17% to 1.10% of annual compensation. In addition, each participating employer is also assessed a \$60 per covered employee administrative expense. Please note that the resulting total contribution requirement for New Britain Police is determined by applying the 1.10% of annual compensation plus the \$60 per covered employee expense less \$4,852 due to the annual recognition of the remaining surplus allocated to that employer as of June 30, 2016.

The actuarial assumptions recommended by the actuary and adopted by the Commission are reasonably related to the experience under the System and to reasonable expectations of anticipated experience under the System. The valuation method used is the Entry Age Normal Frozen Initial Liability cost method. Gains and losses under this method will impact the employer normal contribution.

This is to certify that the valuation was prepared in accordance with principles of practice prescribed by the Actuarial Standards Board, and that the actuarial calculations were performed by qualified actuaries in accordance with accepted actuarial procedures, based on the current provisions of the retirement system and on actuarial assumptions that are internally consistent and reasonably based on the actual experience of the System.

The actuarial computations presented in this report are for purposes of determining the recommended funding amounts for the System. Use of these computations for purposes other than meeting these requirements may not be appropriate.

Members of the Commission January 19, 2017 Page 2



Future actuarial results may differ significantly from the current results 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. Since the potential impact of such factors is outside the scope of a normal annual actuarial valuation, an analysis of the range of results is not presented herein.

The undersigned meet the Qualification Standards of the American Academy of Actuaries to render the actuarial opinion contained herein.

Sincerely yours,

John J. Garrett, ASA, FCA, MAAA Principal and Consulting Actuary Edward J. Koebel, EA, FCA, MAAA Principal and Consulting Actuary

Edward J. World

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CONNECTICUT POLICEMEN AND FIREMEN SURVIVORS' BENEFIT FUND ROLL FORWARD VALUATION REPORT PREPARED AS OF JUNE 30, 2016

SECTION I - SUMMARY OF PRINCIPAL RESULTS

 For convenience of reference, the principal results of the 2014 biennial valuation, and the 2016 biennial valuation are summarized below. Recommended contributions for each participating employer are provided in Section III.

Valuation Date	June 30, 2016 Biennial Valuation	June 30, 2014 Biennial Valuation
Number of Active Members Annual Compensation	634 \$54,611,787	591 \$47,385,319
Retired Members: Number	440	486
Deferred Vested Members: Number	38	29
Annuitant Members: Number Annual Allowances	110 \$1,260,226	99 \$1,214,568
Assets:		
Market Value Actuarial Value	\$ 28,470,233 \$ 30,215,956	\$ 27,190,169 \$ 25,928,660
Funded Ratio	72.3%	71.7%
For Fiscal Year Ending	June 30, 2018 and June 30, 2019	June 30, 2016 and June 30, 2017
Employer Normal Contribution Rate:	1.10%	1.17%

Schedule A of this report presents the development of the actuarial value of assets. Schedule C
details the actuarial assumptions and methods employed. Schedule D gives a summary of the
benefit and contribution provisions of the plan.



SECTION II - ASSETS

- 1. As of June 30, 2016, the total market value of assets amounted to \$28,470,233 as reported by the Comptroller's Office. This represents an investment return of 2.84% and 0.98% for the fiscal years ending June 30, 2015 and June 30, 2016, respectively. Schedule B shows receipts and disbursements of the System for the two years preceding the valuation date and a reconciliation of the fund balances at market value.
- Schedule A shows the development of the actuarial value of assets as of June 30, 2016. The
 actuarial value of assets developed in this valuation is \$30,215,956 reflecting a rate of return on the
 actuarial value of 8.63% and 6.39% for fiscal years ending June 30, 2015 and June 30, 2016,
 respectively.



SECTION III - CONTRIBUTIONS PAYABLE BY EMPLOYER

The following table shows the comparison of the employer normal contribution rate payable by the employer as calculated in the June 30, 2014 biennial valuation and the June 30, 2016 biennial valuation. The 2016 valuation results apply to the fiscal years ending June 30, 2018 and June 30, 2019. These amounts include only the employer normal contribution rate. The recommended dollar amount for each entity is determined by applying the normal contribution rate to annual compensation at the beginning of the applicable fiscal year, plus the additional administrative expense of \$60 per covered employee. In addition, New Britain Police will subtract \$4,852 from the amount determined above due to the annual recognition of their surplus balance as of June 30, 2016. The asset surplus for all other towns has been fully recognized and is \$0 in the June 30, 2016 valuation.

CALCULATION OF ANNUAL NORMAL COST

	June 30, 2016	June 30, 2014
 (1) Actuarial Liabilities Present Value of Future Benefits Payable to: (a) Present Annuitants (b) Present Retired Members (c) Present Active Members (d) Inactive Members (e)Total Actuarial Liabilities 	\$ 11,076,756 15,272,795 14,773,227 <u>658,472</u> \$ 41,781,251	\$ 10,027,159 13,314,771 12,564,114 275,048 \$ 36,181,092
(2) Actuarial Value of Assets	30,215,956	25,928,659
(3) Present Value of Future Contributions by Members	5,518,969	4,752,646
(4) Asset Surplus for all towns except New Britain	0	0
(5) Unfunded Accrued Liability (Surplus) for New Britain	(50,320)	(52,486)
(6) Present Value of Future Employer Normal Costs		
(1e) - (2) - (3) - (4) - (5)	6,096,646	5,552,273
(7) Present Value of Future Salary	551,896,936	475,264,565
(8) Employer Normal Contribution Rate (6) /(7), not less than zero	1.10%	1.17%



CALCULATION OF ESTIMATED CONTRIBUTIONS BY EMPLOYER*

Municipality	Active Members	Estimated Contributions for fiscal year ending June 30, 2018	Estimated Contributions for fiscal year ending June 30, 2019*
Derby Police	34	\$42,279	\$43,687
Manchester Fire	80	96,121	99,318
Middlefield Police	0	0	0
Milford Fire	109	120,319	124,302
Milford Police	111	118,830	122,756
New Britain Police	128	141,020	150,708
New London Fire	61	46,330	47,824
New London Police	71	62,589	64,630
Seymour Police	40	49,216	50,855
Total	634	\$676,704	\$704,080

^{*} Estimated contribution amounts shown above include the \$60 administrative fee per active member and the offset for the New Britain Police municipality.



SCHEDULE A

DEVELOPMENT OF ACTUARIAL VALUE OF ASSETS

		June 30, 2016	June 30, 2015			
(1)	Actuarial Value Beginning of Year*	\$28,357,215	\$25,928,660			
(2)	Market Value End of Year	28,470,233 28,150,0				
(3)	Market Value Beginning of Year	28,150,083	27,190,169			
(4)	Cash Flow					
	(a) Contributions	1,244,031	1,288,514			
	(b) Disbursements	<u>(1,198,686)</u>	<u>(1,104,516)</u>			
	(c) Net: (4)(a) + (4)(b)	45,345	183,998			
(5)	Investment Income					
	(a) Market Total: (2) – (3) – (4)(c)	274,805	775,916			
	(b) Assumed Rate	8.00%	8.00%			
	(c) Amount for Immediate Recognition: [(1) x (5)(b)] + [{(4)(a) + (4)(b)} x (5)(b) x 0.5]	2,270,391	2,081,653			
	(d) Amount for Phased-In Recognition: (5)(a) – (5)(c)	(1,995,586)	(1,305,737)			
(6)	Phased-In Recognition of Investment Income					
	(a) Current Year: (5)(d) * 0.2	(399,117)	(261,147)			
	(b) First Year Prior	(261,147)	305,307			
	(c) Second Year Prior	305,307	23,576			
	(d) Third Year Prior	23,576	(125,613)			
	(e) Fourth Year Prior	<u>(125,613)</u>	<u>220,782</u>			
	(f) Total Recognized Investment Gain	(456,995)	162,904			
(7)	Preliminary Actuarial Value End of Year: (1) + (4)(c) + (5)(c) + (6)(f)	30,215,956	28,357,215			
(8)	Final Actuarial Value End of Year Using 20% Corridor: Greater of [(7) and .8 x (2)], but no more than 1.2 x (2)	30,215,956	28,357,215			
(9)	Difference Between Market & Actuarial Values: (2) – (8)	(1,745,723)	(207,132)			
(10)	Rate of Return on Preliminary Actuarial Value	6.39% 8.63%				

^{*}Prior to Corridor Constraints, if applicable



SCHEDULE B

SUMMARY OF RECEIPTS AND DISBURSEMENTS (Market Value)

	YEAR E	NDING
Receipts for the Year	June 30, 2016	June 30, 2015
Contributions: Members	\$568,490	\$522,889
Employer/Transfers	<u>675,541</u>	<u>765,625</u>
Subtotal	1,244,031	1,288,514
Investment Earnings (net of expenses)	<u>274,805</u>	<u>715,916</u>
TOTAL	1,518,836	2,064,430
Disbursements for the Year Benefit Payments	(1,182,135)	(1,089,467)
Refunds to Members	<u>(16,551)</u>	(15,049)
TOTAL	(1,198,686)	(1,104,516)
Excess of Receipts over Disbursements	320,150	959,914
Reconciliation of Asset Balances		
Asset Balance as of the Beginning of Year	28,150,083	27,190,169
Excess of Receipts over Disbursements	<u>320,150</u>	<u>959,914</u>
Asset Balance as of the End of Year	28,470,233	28,150,083
Rate of Return	0.98%	2.84%



SCHEDULE C

OUTLINE OF ACTUARIAL ASSUMPTIONS AND METHODS

Adopted or reaffirmed by the Commission for the June 30, 2012 and later valuations.

VALUATION INTEREST RATE: 8.00% per annum, compounded annually, net of expenses.

SALARY INCREASES: Representative values of assumed annual rates of salary increase are as follows:

Age	Rate
25	11.00%
30	7.00%
35	6.00%
40	5.00%
45	4.50%
50	4.25%
55	4.25%
60	4.25%

SEPARATIONS FROM ACTIVE SERVICE: Representative values of the assumed annual rates of separation before service retirement are as follows:

Age	Withdrawal	Disability	Death	Service Retirement
25	7.0%	0.142%	0.008%	
30	5.0	0.149	0.011	
35	4.0	0.220	0.015	
40	2.0	0.318	0.023	
45	1.0	0.488	0.032	25%
50		1.105	0.050	20
55		3.029	0.077	12
60		6.884	0.122	20
65				100



DEATHS AFTER RETIREMENT: The RP2000 Mortality Table for Annuitants and Non-Annuitants (set forward one year for males and set back one year for females) is used for the period after retirement and for dependent beneficiaries. Representative values of the assumed annual rates of mortality are as follows:

Age	Men	Women	Age	Men	Women
40	0.114%	0.065%	65	1.441%	0.862%
45	0.162	0.103	70	2.457	1.486
50	0.245	0.155	75	4.217	2.546
55	0.420	0.242	80	7.204	4.151
60	0.768	0.444	85	12.280	6.952

For disabled retirees, the same table is used, adjusted with the male table set forward five years and the female table set forward one year. No mortality is assumed for children in receipt of a benefit.

ASSET METHOD: Actuarial Value, as developed in Schedule A. The method of valuing assets is intended to recognize a "smoothed" market value of assets. Under this method, the difference between actual return on market value from investment experience and the expected return on market value is recognized over a five-year period. The actuarial value of assets is constrained to an 80% to 120% corridor around market value of assets.

VALUATION METHOD: Entry Age Normal Frozen Initial Liability Cost method. Under this method, actuarial gains and losses will directly impact the normal contribution calculations of the employers. Initial liabilities for employer joining the Fund are determined upon entry and amortized over a 30-year period as a level dollar amount. This amortization amount is required in addition to the normal contribution and administrative expenses of the Fund.

SPOUSES: For members who have elected spouse coverage, husbands are assumed to be two years older than their wives.

PERCENT MARRIED: 90% of active members are assumed to be married.

LOADING: Since some retiree membership data has historically been reported without spousal information, a load has been added to more accurately reflect the potential retiree liability. The load factor is based on the assumed discount rate, post-retirement mortality tables and marital assumptions.



SCHEDULE D

SUMMARY OF MAIN BENEFIT AND CONTRIBUTION PROVISIONS

The Connecticut Policemen and Firemen Survivors' Benefit Fund became effective July 1, 1966. The following summary describes the main membership, benefits and contribution provisions of the Fund as interpreted for the valuation.

MEMBERSHIP

Any municipality may elect or vote to include any of its policemen and/or firemen as of the next following July 1st. Only full-time employees are eligible for membership.

BENEFITS

Survivor benefits are provided upon the death of an active or retired member of the Fund. Benefits are based on the annual rate of full-time pay on the date of death. For retired members, the rate of pay immediately prior to retirement is used.

The annual benefit payable from the date of death is equal to one of the following:

- 1. To a surviving spouse, an amount equal to 30% of pay.
- 2. To a surviving spouse with one dependent child under the age of 18, an amount equal to 45% of pay.
- 3. To a surviving spouse with two or more dependent children under the age of 18, an amount equal to 60% of pay.
- 4. To one dependent child under the age of 18 in the case where there is no benefit payable to a surviving spouse, an amount equal to 30% of pay.
- 5. To two or more dependent children under the age of 18 in the case where there is no benefit payable to a surviving spouse, an amount equal to 45% of pay.
- 6. To a depended parent in the case where there is no benefit payable to a surviving spouse or dependent child, an amount equal to 30% of pay.



Benefits to surviving spouses cease upon death or remarriage. Benefits to dependent children cease at age 18. Benefits to dependent parents cease upon death.

If there are no survivors eligible for a benefit on the date of the member's death, accumulated member contributions without interest are paid to a designated beneficiary of the member's estate.

CONTRIBUTIONS TO THE FUND

Active members contribute at the rate of 1.00% of salary. Participating municipalities contribute an amount as determined by the biennial actuarial valuation that is necessary to adequately fund all benefits. An annual administration fee of \$60 per active member is also paid by the employer.



SCHEDULE E

DETAILED DISTRIBUTIONS OF THE DATA

Total Active Members as of June 30, 2016 Distributed by Age Group and Years of Service

Age	Derby	Manchester	Middlefield	Milford	Milford	New Britain	New London	New London	Seymour		Total
Group	Police	Fire	Police	Fire	Police	Police	Fire	Police	Police	No.	Compensation
Under 25 25 to 29	2	0	0	2 16	5 17	7 31	0	5 9	1	22 103	1,271,597 8,062,108
30 to 34	11	7	0	16	29	27	7	10	1	108	8,983,093
35 to 39	2	11	0	16	10	26	3	9	4	81	7,193,260
40 to 44	5	11	0	22	24	18	8	6	10	104	9,340,325
45 to 49	3	19	0	15	9	14	8	17	10	95	8,794,178
50 to 54	5	17	0	14	10	4	18	8	2	78	7,132,787
55 to 59	1	4	0	8	4	1	4	7	2	31	2,805,118
60 & Up	2	0	0	0	3	0	5	0	2	12	1,029,321
Total	34	80	0	109	111	128	61	71	40	634	54,611,787

Average Age: 40.1 Average Service: 11.9 Average Pay: \$86,138



Eligible Retirees and Deferred Vested Members as of June 30, 2016 Distributed by Age Group

Age Group	Derby Police	Manchester Fire	Middlefield Police	Milford Fire	Milford Police	New Britain Police	New London Fire	New London Police	Seymour Police	Total Count
Under 30	1	3	0	1	2	7	3	7	0	24
30 to 34	0	0	0	1	1	9	2	17	2	32
35 to 39	0	2	0	4	8	11	2	9	0	36
40 to 44	3	4	0	1	6	9	1	6	1	31
45 to 49	0	4	0	7	9	3	2	9	2	37
50 to 54	1	7	0	17	24	1	1	13	3	68
55 to 59	5	12	0	13	20	2	3	12	0	67
60 to 64	3	4	0	16	9	0	4	9	6	51
65 to 69	2	11	0	9	30	0	1	9	7	69
70 to 74	1	3	0	15	1	0	28	4	3	55
75 to 79	0	0	0	0	1	0	0	2	4	7
80 to 84	0	0	0	0	0	0	0	1	0	1
85 to 89	0	0	0	0	0	0	0	0	0	0
90 & Up	0	0	0	0	0	0	0	0	0	0
Total	16	50	0	84	111	42	47	98	28	478

Average Age: 54.4



Total Annuitants as of June 30, 2016 Distributed by Age Group

Age	Derby	Manchester	Middlefield	Milford	Milford	New Britain	New London	New London	Seymour		Total
Group	Police	Fire	Police	Fire	Police	Police	Fire	Police	Police	No.	Annual Benefit
Under 30	0	0	0	0	1	0	0	0	0	1	20,375
30 to 34	0	0	0	0	0	0	0	0	0	0	0
35 to 39	0	0	0	0	1	0	0	0	0	1	20,793
40 to 44	0	0	0	0	0	1	0	0	0	1	21,790
45 to 49	1	0	0	1	0	0	0	0	0	2	42,171
50 to 54	0	0	0	0	1	0	0	0	0	1	31,816
55 to 59	0	1	0	0	1	0	0	0	3	5	89,263
60 to 64	1	1	0	1	1	0	2	4	1	11	146,499
65 to 69	0	0	0	2	6	0	4	0	1	13	170,551
70 to 74	0	3	0	5	4	0	3	1	0	16	184,159
75 to 79	2	2	0	9	2	0	5	0	0	20	195,472
80 to 84	0	5	0	2	1	0	4	3	0	15	161,338
85 to 89	0	1	0	9	4	0	0	2	0	16	127,397
90 & Up	1	0	0	1	3	0	1	1	1	8	48,601
Total	5	13	0	30	25	1	19	11	6	110	1,260,226

Average Age: 74.6

Average Benefit: \$11,457